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North Carolina Medical Journal

For Doctors and Their Patients

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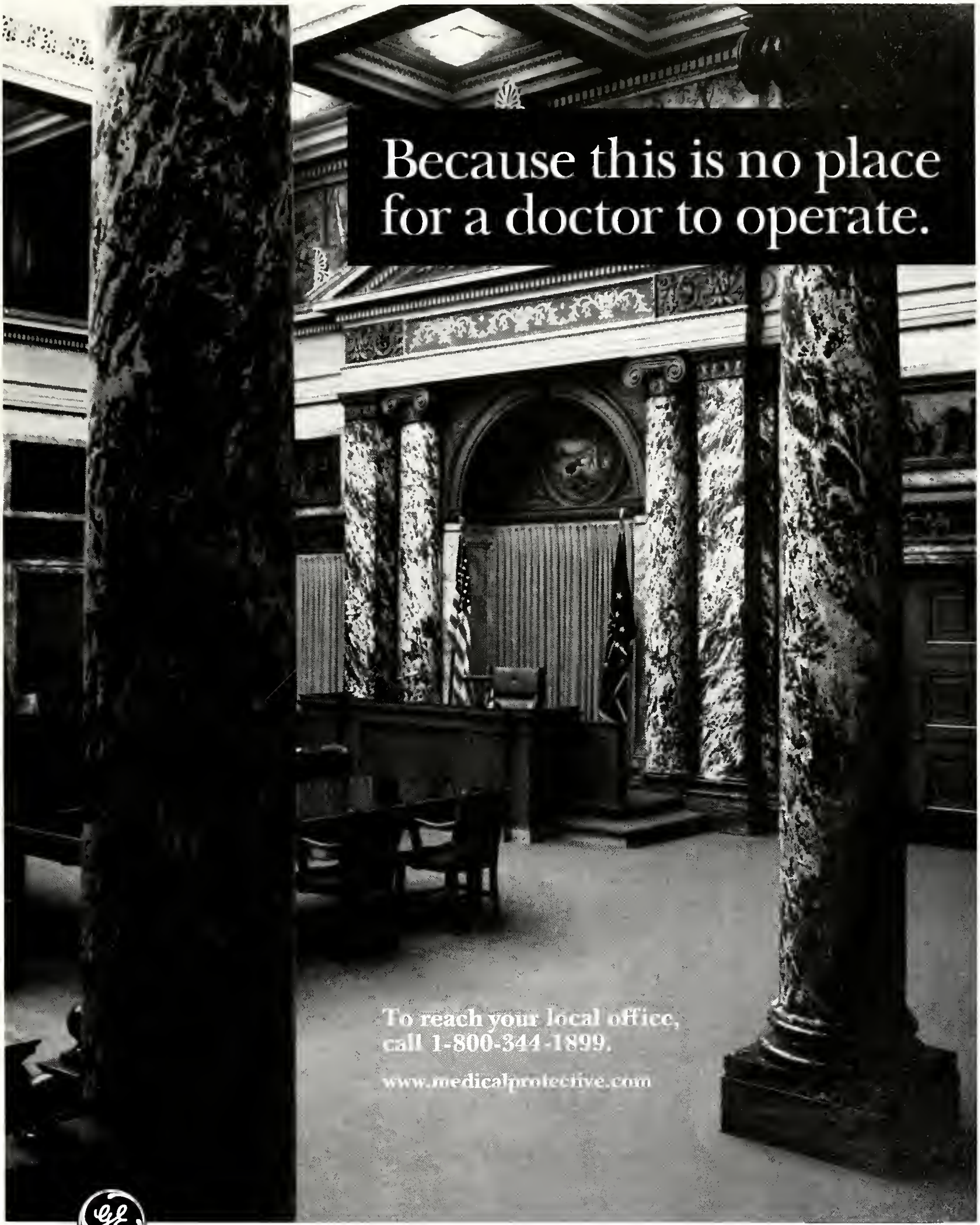
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North Carolina Medical Journal

FOR DOCTORS AND THEIR PATIENTS

January/February 2000, Volume 61, Number 1

Cover: Thanks to a bravura, historic feat of engineering, the Cape Hatteras Lighthouse begins the new millenium safely out of reach of rising waters. Dr. Margaret Harker, a member of our editorial board, photographed the lighthouse en route to its new, safer site. She says readers may find connections not only with the flood recovery efforts described in this issue, but perhaps with the Journal's fate as well. Dr. Harker has donated the photo to the Outer Banks Lighthouse Society, Box 1005, Morehead City 28557.

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Letters to the Editor

Expectant Management of Prostate Cancer—The Author Replies

To the Editor:

I appreciate the comments by Drs. Anscher and Lucey [NC Med J 1999;60:313-4] regarding my recent article on the expectant management of prostate cancer [NC Med J 1999;60:261-7]. PSA screening has produced enormous controversy in the medical as well as the lay community. We have seen a drop in the number of prostate cancers treated each year since 1992, as well as an increase in the percentage of organ-confined tumors, probably from aggressive prostate cancer screening efforts. Attempts have been made to enhance PSA testing by using PSA velocity, PSA density, age-adjusted PSA levels, as well as the ratio of free to total PSA. Many investigators have demonstrated that there is approximately a 33% chance of detecting prostate cancer on biopsy in men older than 50 years who have a PSA greater than 4.0. A positive predictive value of 30-33% for PSA screening is higher than that for detecting breast cancer by mammography (7-17%).

Secondly, Albertsen et al reported [JAMA 1998;280:975-80] a correlation between the Gleason grade of the cancer and death from prostate cancer over 15 years of follow-up. Death occurred in only 4-7% of men with well-differentiated cancers of the prostate (Gleason grades 2-4). Epstein et al [JAMA 1994;271:368-74] examined the relationship between tumor volume and the risk of disease progression. They concluded that patients with tumor volume greater than 0.2 cc, whose Gleason grade was greater than 5, were at risk for cancer death. The American Cancer Society National Prostate Cancer Detection Program evaluated the screenings of over 6,000 men and found that over 90% of those men with tumor volume of >0.5 cc and Gleason grade ≥5 had clinically significant cancers.

As Dr. Lucey pointed out, up to two-thirds of clinically confined tumors are understaged, and, in up to 60% of cases, radical prostatectomy leaves tumor behind. Higher PSA levels and higher clinical tumor stage and grade correlate with higher pathological stage, but no prognostic variable can be applied independently and individually to predict pathological stage [J Urol 1993;149:110-4].

Two trials are currently under way looking specifically at reducing prostate cancer mortality and screening: the NCI-sponsored PLCO trial and the European Cancer Program. Together they will enroll over 125,000 patients. Unfortunately, the results will not be available for another decade.

Andrew S. Griffin, MD
2932 Lyndhurst Avenue
Winston-Salem, NC 27103

Do Growth Hormones Retard Aging? Hopeful Patients Want to Find Out

To the Editor:

I was interested to read Dr. Jayaraj's article regarding giving hormones to the healthy elderly [NC Med J 1999;60:340-5]. Recently an 84-year-old patient with moderate degenerative arthritis, in otherwise good health, asked me to prescribe growth hormone for her to control and potentially reverse the aging process. I was initially taken aback by the request and didn't know how to respond. She showed me a book she had read [Jamieson J, Dorman LE. *Growth Hormone: Reversing Human Aging Naturally: the Methuselah Factor*]. I borrowed the book and asked her to come back when I'd read it. The book refers to the studies mentioned by Dr. Jayaraj, as well as several others. However, through the use of testimonials, it hypes and extrapolates the results beyond what the studies actually showed.

When the patient returned two weeks later she told me that she had found an Internet site selling growth hormone tablets without a prescription. I told her that I did not feel comfortable prescribing growth hormone but that if she decided to take the hormone on her own I agreed to follow her with basic laboratory data and office visits, in a "N of One" experiment. I am very skeptical that she will have any benefit.

One of my endocrine colleagues advised me that the tablets she would be taking were probably L-arginine, which would release endogenous growth hormone, because growth hormone is a protein which would be digested if taken orally. He suggests that I measure insulin-like growth factor in about two months, to see if this reflects a change in growth hormone. He does not expect any evidence of change. Any subjective improvements in the patient's condition would be a placebo effect under these circumstances.

I was surprised that one of my elderly patients would ask me for growth hormone to retard the aging process. Dr. Jayaraj's article was timely and has helped me deal with this situation in my own practice. I wonder if there are other physicians in the state who have had requests for growth hormone from their elderly patients.

Robert C. Turner, MD, FACP
Physicians East
4796 Old Tar Road
Winterville, NC 28590

Attitude is Primary

To the Editor:

I would like to commend Dr. Neelon for his commentary, "Primary Care Providers: The View from Where I Stand" [NC Med J 1999;60:211]. As a general practitioner/family physician/primary care provider for over 50 years in North Carolina, I heartily concur with Dr. Neelon's opinion that *attitude* is a real defining characteristic of competent primary care physicians and is much more important than what their formal training might have been.

Many—probably most—primary care providers of my generation had a rotating internship of two years or less before beginning practice; they are basically self-trained, "on-the-job" learners who have mastered a multitude of currently available procedures.

It is my genuine hope that we will not lose the opportunity for any physician with an appropriate "primary care attitude" to perform these services for his or her patients.

R. H. Shackleford, MD
238 Smith Chapel Road
Mount Olive, NC 28365

We've Got Mail

To the Editor:

I am a writer and journalist based in London. I am doing research for a popular history of science book about medicine and premature babies and am interested in information about the changes in new-born intensive care over the last half century. I'd be most grateful if you could help me get hold of a copy of an article by RS McGee on the use of pulmonary surfactant to treat respiratory distress syndrome in neonates [NC Med J 1993;54:447-51]. Geographically, my book will range far and wide, and a fair proportion of it will focus on the North American experience. I would welcome hearing from your readers with anecdotes or reminiscences about the evolution of newborn intensive care.

Christopher Hadley
iceberg.nonfiction@virgin.net

To the Editor:

I am a PhD student in Environmental Science and Public Policy at George Mason University. I am doing a short class paper on toxic dinoflagellates and found your article on pfiesteria in North Carolina [NC Med J 1998;59:216-20] very useful. Thank you for your assistance. Very nice web site!

Jorg Huckabee
eenkriek@tidalwave.net

To the Editor:

I would like to know how I can get a copy of the article regarding the health hazards of pepper spray [NC Med J 1999;60:268-74]. I am an attorney in Florida and I found out about the article on the web. I would really like to read the article as it could apply to a case I am handling regarding pepper spray. Thanks for your help.

Charlie Vanture
CVlaw@aol.com

To the Editor:

I will be grateful if you could kindly send me a sample copy of your Journal, if available. Thank you.

Dr. K. Moi
15-12-4, Danau Impian Condo
Jalan 3/109F, Taman Danau Desa
58100 Kuala Lumpur
Malaysia

To the Editor:

I am presenting rounds next week on intimate partner violence . On Medline, I came across an interesting article from your journal, *Working with the spouse abuser* [N C Med J 1997:58;324-5]. Our library will not be able to get the article in time. Is there any way it could be emailed to me? I realize that this is a 'long shot' and will understand if the request is felt to be unreasonable.

Sam Campbell, MD
EMSGC@qe2-hsc.ns.ca

The Editor Replies:

With our new online edition later this year, we hope to have comprehensive electronic archives so that all back articles will be available for down-loading or email. Until then, we don't mind faxing requested articles from time to time. We like to get the Journal in as many hands as possible!

NC Med J Delivers

To the Editor:

I wanted to let you know how much I enjoyed Dr. Meymandi's recent article in the Journal [NC Med J 1999;60:320-1]. Such insight into today's plight of medicine! His solution to the problem is indeed simple and forthright. May we all have the courage to act.

Keep up the good work with the Journal. It is a most interesting and informative magazine for the medical profession.

H. Raymond Madry, Jr., MD
madry2105@webtv.net

To the Editor:

I wish to congratulate Drs. Willson and Meymandi on their articles [NC Med J 1999;60:319-21. I hope they are not too optimistic about influencing change. Note that the health care industry includes drug companies, hospital suppliers, equipment manufacturers—all with a vested interest in the bottom line. HMOs have just taken a minor hit but will go down raising prices to meet profit expectations. Nevertheless the authors should be recognized for speaking up for what medicine was and should be. As I always taught, the patient comes first.

Eugene Furth, MD
eugenefurth@hot.mail.com

To the Editor:

I have just finished reading "Historic Representations of Medicine in Art [NC Med J 1999;60:328-32]. This is beautifully done and the illustrations are superb.

I particularly enjoyed the articles by my friends Dr. Meymandi and Dr. Frazier. The whole issue is extremely good. I am glad to hear we are "stable" for a couple ofyears and the work is going on to get more permanent support.

Eben Alexander, Jr., MD
Wake Forest University Baptist Medical Center
Winston-Salem, NC 27157

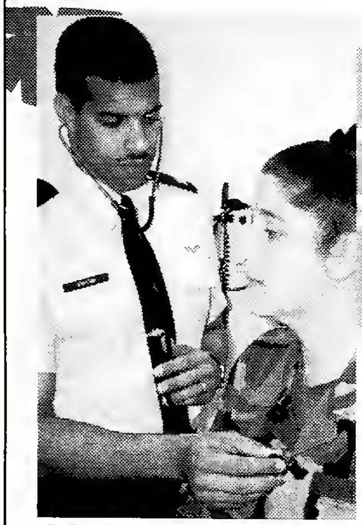
To the Editor:

The November/December Journal is outstanding, and the article on the medical art exhibit the best of a top-notch collection of articles. Terrific graphics and commentary. Congratulations to all who contributed.

William G. Porter, MD
2026 Dartmouth Place
Charlotte, NC 28207

Note from the Editor: The photographs accompanying the article on The Physician's Art exhibit (NC Med J 1999;60:328-32) were taken by Bill Bamberger. An exhibit of photographs from Mr. Bamberger's widely acclaimed book, *Closing: the Life and Death of an American Factory* (Cathy N. Davidson, co-author) has recently been shown at the North Carolina Museum of Art, Yale University, and the Smithsonian Institution. The *Journal* is very grateful to Mr. Bamberger for the use of his fine photographs, and we regret that he was not properly acknowledged in the last issue.

THE SKY'S NO LIMIT



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Organized Medicine's Response to Hurricane Floyd

Mike Edwards, BA, and Myra Schwartz, MA

Figure 1. Flood recovery volunteer Clay Richardson, MD, of Glen Alpine , talks with a patient at the Grifton clinic.

The telephone calls signaled what the victims already knew—Hurricane Floyd had dealt an unprecedented blow to Eastern North Carolina. By the afternoon of September 17, 1999, after more than 20 inches of rain brought the worst flooding in the state's history, dozens of physicians had called the North Carolina Medical Society to volunteer their services in the deluged counties. Four days later, Dr. Dennis McBride, the State Health Director, asked the Medical Society to serve as primary liaison between the medical community and physicians and clinics struggling to restore what floodwaters had damaged or destroyed. For the next three weeks, by means of telephone calls, e-mail, and faxes, the Medical Society worked to connect physicians wanting to help with those in need. The Society's efforts were augmented by the North Carolina Academy of Family Physicians (NCAFP) and the NC Academy of Physician Assistants (NCAPA).

The Scope of the Problem

A September 28 fax from the Nash County Medical Society defined the punch delivered by Floyd. Twelve physicians in the Rocky Mount area had experienced damage to their homes, and seven reported damages to their offices. The waters from Stoney Creek overflowed Zebulon Road, quickly filling the building that housed the practice of Camilla Proctor, MD. Within a week, she found space to reopen her practice in the Nash Medical Arts Mall. Fortunately, Dr. Proctor had flood insurance, but she's not sure that insurance will replace the equipment she lost.

In Wayne County, Muhammad Bhatti, MD, knew he faced losses, but only after several days had flood waters receded enough for him to enter his office and assess the damage to the Wayne Family Medical Center. The power outage left his refrigerator inoperable, ruining the medications and vaccines inside. Dr. Bhatti's recovery has been aided by generous donations from physicians, pharmaceutical companies and others.

During the first few weeks of recovery, more than 300 physicians, physician's assistants, residents, and medical students volunteered to help in the flood-affected areas. Glen

---

Mr. Edwards is Director of Communications for the NC Medical Society and can be reached at 919/833-3836 or medwards@ncmedsoc.org. Ms. Schwartz is Director of Communications/Special Projects for the NC Academy of Family Physicians and can be reached at 919/833-2110.

Withrow, MD, a family practitioner from Chapel Hill, spent several weekends at a makeshift clinic in Grifton. He saw about 150 people during the first weekend, using a mobile classroom at a local school for a temporary clinic. "We used a room designed for a music class, and we had to use a piano for a privacy screen," said Withrow. "Many of the patients I saw really just wanted someone to listen," recalled Withrow. "I spent a lot of time holding hands and trying to reassure them. You could see the stress and strain in their faces." Withrow collected material donated by doctors in Chapel Hill and Durham to help patients who had lost prescriptions and medical monitoring devices in the floodwaters.

More than 50 family doctors spent time at clinics or practices in Grifton, Bethel, Tarboro, and other eastern North Carolina communities, relieving physicians who had been working overtime since the hurricane. Don Pathman, MD, from UNC-Chapel Hill, found a tide of depression and anger among the patients he saw at the Grifton clinic. More than 400 homes were damaged or destroyed by Floyd in the small town on the borders of Pitt and Lenoir counties. The rain that fell days after Floyd left only worsened the mood of the residents, many of whom were living in temporary shelters. On October 11, the county health department delivered 500 doses of flu vaccine; just two days later, Dr. Pathman wrote to the NCAFP that "the clinic is flooded with folks needing influenza injections."

Medical students, too, learned first-hand about the suffering of flood victims. Many students at the East Carolina University School of Medicine lost most, if not all, of their possessions in Greenville's record flood.

Figure 2. Doctors and nurses in Grifton take a much-needed dinner break.

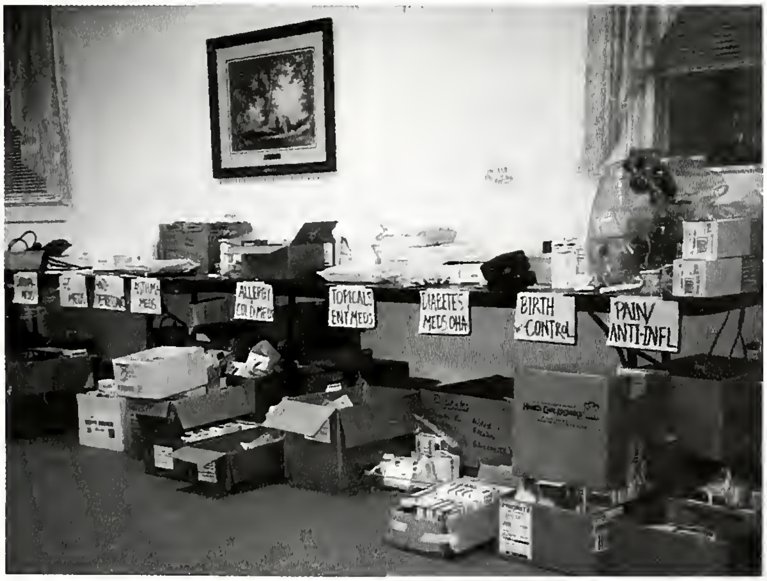

Figure 3. Donated medicines and supplies line a hall in the Grifton clinic.

Rallying to the Call

At its October meeting, the NC Medical Society Executive Council allocated $10,000 to help students affected by the flooding. By early December, another $7,400 had been contributed to the NCMS Foundation by physician and physician assistant members of the NCMS, and $1000 arrived from the Medical Society of Virginia. By December 1, the NC Academy of Family Physicians had collected nearly $20,000 for physician and clinical relief efforts. The NC Society of Plastic and Reconstructive Surgery contributed $2,500.

Not everyone who offered help was called. The crisis stage passed more quickly than anticipated by L.D. "Lew" Stringer, MD, one of the officials commanding the Special Operations Response Team, physicians trained to practice under disaster conditions. "Not all doctors can handle the kind of situations that we saw in the first few days following the flooding," said Dr. Stringer. "Sometimes it becomes emotionally overwhelming to physicians who are used to practicing in the more pristine setting of a hospital or clinic."

The Future

By late September, the flood recovery was moving from the "crisis stage" to long-term recovery. At the request of Dr. Stringer and H. David Bruton, MD, Secretary of Health and Human Services, doctors were asked to begin working on a oneto-one basis with colleagues who were recovering from the flooding. Groups of doctors, residents, and medical students spent their free time and days off in the flood-stricken areas, helping the local health care teams in whatever ways they could.

On October 20, HealthEast president Tom Irons, MD, invited physicians, public health officials, and members of the NCMS to a meeting in Greenville to discuss long-term recovery for eastern NC. Most of the clinics and practices affected by Floyd were back in operation, but finances were a problem. Some 500 health care employees of medical offices, clinics and hospitals in Pitt and Edgecombe counties were among the thousands of flood victims. They lost homes and possessions, and many also lost their jobs—some permanently—to the lingering floodwaters that shut down so many businesses. Those attending the Greenville meeting realized that long-term recovery would have to center around rebuilding the region's already fragile economy.

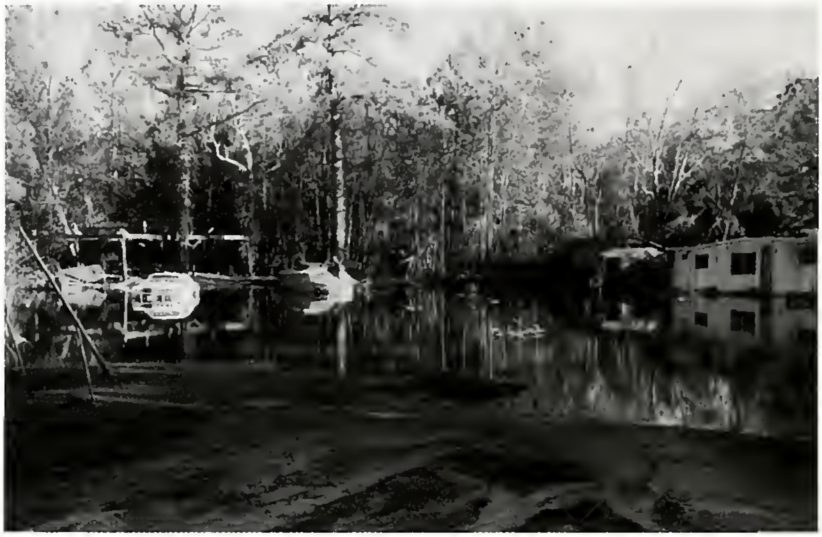

Figure 4. More than 400 homes in the Grifton area were damaged or destroyed by the extensive flooding of Hurricane Floyd.

A team of state agencies, working with the School of Pharmacy at UNC-Chapel Hill, developed a hotline to accept donations of pharmaceuticals, medical supplies and durable medical equipment. Public health departments, health centers and free clinics were notified in November that drugs and supplies were available for those patients who otherwise were unable to replace what they had lost to floodwaters.

Dr. Stringer and Dr. Irons expect that flood victims will need on-going assistance through Easter, and possibly longer. Much of that assistance will focus on mental health needs and helping victims endure the slow progress of recovery. Governor Hunt recently unveiled a $830 million plan for flood recovery which, if approved by the General Assembly, will play a critical role. Dr. Irons and others believe, however, that it is the determination and spirit of the people themselves that will ultimately bring about full recovery and restore the health of eastern North Carolina to what it was before Floyd's fury was unleashed on the pastoral heart of North Carolina's farming enterprise. ❐

. . . And Thank You Again

We continue to be grateful to the *Journal*'s friends and supporters, as they continue to join the ongoing effort to preserve the *Journal*'s role in North Carolina medicine. We would like specifically to express our thanks to these latest generous contributors:

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Response of the Pitt County Medical Community

Joseph A. Franklin, MD, Wilhelmine Wiese, MD, John T. Meredith, MD, Janice F. Lalikos, MD, Jeanette M. Dolezal, PhD, Denise Brigham, RN, William A. Wooden, MD, and Christopher Ohl, MD

On September 15, 1999, Hurricane Floyd hit the North Carolina coast as a Category 2 storm (*The Daily Reflector*, Greenville, NC. November 21, 1999;1-16). As this abnormally large storm system approached the East Coast, its potential for devastating winds and coastal flooding led to the largest peacetime evacuation in US history. The greatest impact of Floyd, however, was caused by the more than 19 inches of rain added to several inches left by Tropical Storm Dennis during the preceding week. Coastal beaches and estuaries were spared significant damage, but the inland regions of Eastern North Carolina were devastated—first by flash flooding of small streams and creeks, and several days later by flooding of the major rivers.

In Pitt County, one of the most severely affected areas, the Tar River crested at more than 24 feet above flood stage at Greenville. Overall, North Carolina sustained 52 deaths, the partial or complete loss of 30,000 homes, and the flooding of many roads east of Interstate 95. Some 10,000 people were temporarily housed in hurricane shelters, and 500,000 people lost access to water and electrical power. Agriculture was devastated because one-third or more of some counties' land was under water (Figure 1). The total costs of storm damage will probably exceed $6.0 billion and those in Pitt County, $1.6 billion.

Pitt County Memorial Hospital (PCMH) is a 731-bed facility in Greenville, NC, owned and operated by University Health Systems (UHS) of Eastern Carolina. It is the teaching hospital for East Carolina University School of Medicine (ECU-SOM), and provides primary medical care for Pitt County and tertiary medical care for 29 counties in eastern North Carolina.[1] PCMH was severely affected by the loss of transportation infrastructure and disruption of its electrical power and water utilities caused by flooding of the Tar River. For 36 hours, no roads were open into or out of the city of Greenville, making PCMH inaccessible via land transportation. At the same time, the medical needs of the county were

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great and the populace had only limited access to other medical care. A quick response was necessary to preserve the public health and welfare of the region. Ingenuity and teamwork on the part of the hospital's medical and ancillary staff and a close working relationship with the Pitt County Health Department proved to be great assets of the health care community. In this paper we provide a brief synopsis of how our medical community responded to the health care needs of the larger community in crisis.

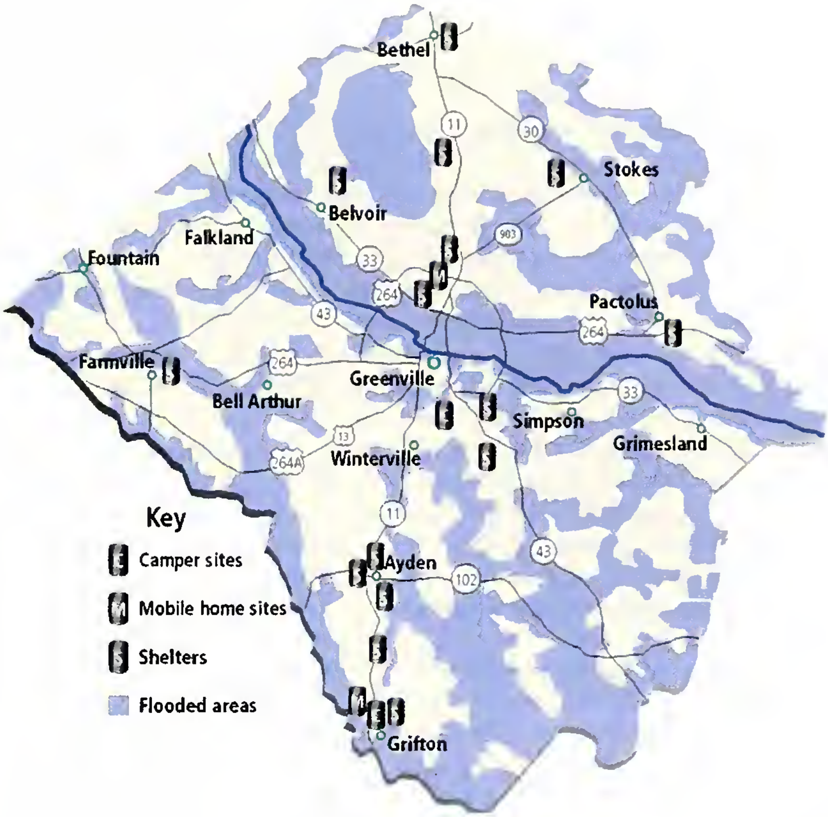

Figure 1. Flooding in Pitt County. Source: *The Daily Reflector*, Greenville, NC.

Creating a Chain of Command

During any disaster, it is critically important to establish a command center. At UHS, the Emergency Department has traditionally been responsible for disaster management during hurricanes and other disasters. In such cases, Emergency Medicine works with the leaders of University Health Systems under a modification of the Hospital Emergency Incidence Command System[2]—a disaster management tool developed in Orange County, CA—and closely coordinates its activities with the Pitt County Health Department. The Hospital Emergency Incidence Command System creates a responsibility-oriented chain of command and prioritizes job actions based on mission-oriented tasks. Forty-eight hours before Floyd's landfall, the Hospital Emergency Incidence Command System was in operation, with a Hospital Command Center (HCC) open and manned 24 hours later. From this center the hospital core leadership was able to operate the hospital for 11 days, during which it had no external source of electric power for 2.5 days and no potable water for 4 days. The HCC and leadership staff directed all hospital operations at PCMH and provided supplies, personnel, and logistical support to five smaller hospitals in the region.

We quickly learned that federal, state, and county disaster plans may not meet the operational needs of a large tertiary medical facility, because Federal Emergency Management Agency and the State Emergency Response Teams focus their efforts at the county and regional level. Consequently, on the second day after Hurricane Floyd landfall, the HCC received a large number of requests to shuttle patients and staff to and from PCMH as well as patients and medical equipment from outlying medical facilities and shelters. Because of the overwhelming demand, a Transportation Center was created to handle all transportation requests.

Impact of Disrupted Transportation

The PCMH Transportation Center established health care transportation networks within the region. Because flooded roads and bridges made Greenville inaccessible by land, many transportation problems were solved by helicopter transport. The UHS air ambulance helicopter logged more than 180 patient flights in the week after Floyd hit, compared with the usual average of 20-25. To meet the demand, three additional helicopters and flight crews were recruited—one from Mission-St. Joseph Hospital in Asheville; one from the University of Pittsburgh Medical Center; and one from Rocky Mountain Air, an organization that leases aircraft to PCMH. A military helicopter was also assigned to PCMH and dedicated to hospital missions. Ground transportation resources included the hospital motor pool and NC National Guard military vehicles.

Transportation of staff to the hospital was a major problem. Because the Tar River runs though the center of Pitt County, flood waters effectively divided Greenville and the surrounding county into north and south components, with all bridges across the river impassible. From the hospital, located in the southern portion, the north county was accessible only by air or boat. Many of the hospital's nursing, ancillary, and support staff had to be airlifted to and from work in order to continue hospital operations.

Impact of Disrupted Electric Power and Water

During and immediately after the hurricane, municipal power and water supply to PCMH were uninterrupted. However, as the river continued to rise, it became clear that the principal electrical substation and power distribution center for the city and county would soon be submerged. In addition, within 48 hours of landfall, the Greenville water purification plant was no longer able to ensure the quality of its water and warned that eventually its pumps would fail to provide water pressure for the hospital or community. We could not continue most levels of hospital operation without power or water. Despite advance warning of impending utility failure, there was very little time for the hospital engineers to provide a back-up.

Two days after Floyd's landfall, the power distribution station succumbed to the Tar River, and the Greenville Utilities Commission disconnected Pitt County from the power grid. The region was expected to be without power for several days—perhaps more than a week. The hospital's emergency generator system was designed to produce only limited amounts of electricity for selected critical systems, not to run an entire hospital for a prolonged period. The Army Corps of Engineers and the National Guard airlifted additional electric generators and spare parts to PCMH and helped secure generator fuel and qualified electricians to monitor and wire necessary circuits. Fortunately, municipal power was restored after two days, but it remained tenuous.

> "Ingenuity and innovation led the UHS Plant Operations to convert the PCMH Rehabilitation Center swimming pool into an 88,000 gallon reservoir and settling tank for a hospital water system."

As the Tar River crested, the city water system failed and the hospital lost all pressurization of its internal water system. In order to provide back-up water, PCMH had to design a system that would provide an initial 100,000 gallons to establish water pressure and then 200-600 gallons per minute to allow near normal usage. Ingenuity and innovation led the UHS Plant Operations to convert the PCMH Rehabilitation Center swimming pool into an 88,000 gallon reservoir and settling tank for a hospital water system. Existing pool water was pumped back into hospital pipelines to provide initial pressurization of the system, and an inactive onsite well was reactivated to provide up to 300 gallons per minute. In addition, tank and pumper trucks from volunteer fire departments located within 100 miles brought additional water from communities with functional water treatment facilities. Both well water and trucked-in water were pumped into the rehabilitation pool and particulate matter allowed to settle before the water was pumped through an access valve into hospital pipes.

For 24 hours before the provisional water system was operational, the hospital had to limit water use severely. We used bottled water for drinking and cooking, waterless handwash solution, and portable outdoor toilets. Patients were not allowed to flush toilets in their hospital rooms. Laboratory testing was limited to routine chemistry and complete blood counts. Radiology could provide only routine radiographs (computerized tomography and magnetic resonance imaging require water to cool the instruments). Primary chemotherapy was curtailed and radiation therapy halted. Fortunately, once the alternative water system was operational there was sufficient water for all of the above activities, but bottled water was still used for food and drink because water from the improvised system was not considered potable.

Because a continuous, uncompromised supply of water and electricity could not be guaranteed, elective surgery at PCMH and an ambulatory surgery center was cancelled between September 16 and September 24, 1999. Only urgent and emergency cases were allowed. During the crisis period, 122 patients were operated on at PCMH, approximately half of the normal volume, and overall some 750 surgical cases were postponed.

Ensuring Access to Health Care

Because transportation was disrupted, much of the county had no access to medical care. Flooding hampered the delivery of medical supplies, food, and water to the community shelters. Prior to the arrival of national organizations such as the Red Cross, many of the hospital's clinical services developed acute action plans to deploy medical care where the need was greatest. Examples of those plans included the following:

◆ In addition to their regular duties in the PCMH Emergency Room, members of the Department of Emergency Medicine continuously staffed the Hospital Command Center and coordinated the Transportation Center. Because of their training in disaster medicine, department members took on many of the organizational tasks for medical outreach.

◆ Since changes in barometric pressure associated with tropical storms may cause premature rupture of fetal membranes, the Department of Obstetrics and Gynecology provided staff and a portable ultrasound machine to evaluate expectant mothers.[3,4] These screening efforts identified three patients needing hospitalization at PCMH, including one woman with preeclampsia.

◆ The Department of Family Medicine provided continuous 24-hour coverage at the Bethel Clinic, which served as the care coordination site for patients north of the Tar River. The Clinic provided triage services, treatment, and referral of patients otherwise cut off from medical care. Faculty and staff from the Department of Family Medicine at the University of North Carolina at Chapel Hill staffed clinics in southern Pitt County.

◆ In a combined effort, the doctors from Departments of Pediatrics, Internal Medicine, and Surgery at ECU-SOM and from the community sent groups of physicians, residents, and nurses to several community shelters. Some shelters were accessible by land, others only by helicopter. At the shelters, the medical teams provided care ranging from tetanus boosters and evaluation of skin rashes to repair of lacerations and management of chronic diseases. Medical teams evaluated an average of 150 patients per day (and more than 1,000 in total).[5]

◆ The Section of Nephrology and staff of the hemodialysis centers had to arrange medical care for nearly 1,000 dialysis patients who potentially could not reach their regional dialysis centers. When dialysis-dependent patients were identified by a local nephrologist, the Transportation Center was notified, and these patients either transported to and from the closest dialysis center or treated by home dialysis. Special arrangements were made to provide adequate power and water for dialysis centers.

◆ The Office of Telemedicine at ECU-SOM installed video cameras and monitoring equipment in selected community shelters to permit video-conferencing capabilities and information links from PCMH to the community. In some shelters, the telemedicine service, cellular telephones, and the radio provided the only contacts with the "outside world."

Many community physicians and local care providers opened their homes and offices to offer medical assistance. Community physicians kept vigil in the shelters, providing care, monitoring chronic diseases, and treating acute injuries. These doctors literally "cleaned out" the medical supplies in their own offices for use in the local shelters. The tremendous effort required to bring medical care to the people succeeded because of teamwork between community- and university-based medical services and local public health officials.

In addition to assuring the safety of its own patients and staff, PCMH and the UHS organization had to help other regional hospitals. At Heritage Hospital in Tarboro, for instance, flooding left one-sixth of the hospital work force homeless. If necessary, food, medical supplies, and additional workers were airlifted from PCMH to other affiliated hospitals.

Medical Outreach and Home Health

To provide services to patients who were receiving home nursing or infusion therapy when displaced from their homes, the hospital activated its standing plan for the care of these patients. Two "special needs" units, with a total of 38 beds, were established in the Physical Therapy Unit and a patient ward at PCMH. Special needs patients were admitted to these two units after being evaluated by UHS Home Health Care nursing personnel. Fifty patients were admitted to these units during an 11-day period and another 100 referred to regional facilities. The units were staffed with skilled nursing personnel, but family members and other caregivers were asked to accompany patients admitted to these special services units.

Durable medical equipment is of particular importance in home health care. The flooding hampered the delivery of medical supplies such as oxygen, so UHS made special efforts to provide portable oxygen for patients and for fire and rescue operations. UHS Home Health Care worked actively to avert unnecessary hospital admissions, both before and after the storm. Written information on hurricane preparedness and safety was provided to all home health system

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Figure 2. Bottled water was used for cooking and drinking at Pitt County Memorial Hospital, as water from an improvised system was not potable.

Figure 3. East Care Ambulance Service provided more than 180 patient flights in Floyd's aftermath.

patients. Plans were in place before the storm made landfall to transport patients to locations where they had more family support or where there were additional community support resources. Furthermore, special care was taken to contact patients by phone every day, even when not required by physician's orders.

Disease Surveillance and Public Health

The threat of contagion and infectious diseases due to flooding from Hurricane Floyd was low, but greatly feared by the public. The national news media broadcast images of catastrophic livestock death and exaggerated suggestions of disease, which increased public apprehension. Many physicians and medical care providers were unsure what specific illnesses or injuries to expect. In response, members of the Infectious Diseases Section of ECU-SOM researched past floods and solicited information from the North Carolina State Health Department and the US Public Health Service's Centers for Disease Control (CDC).[6,7] They developed a monograph outlining the expected impact on public health: minimal risks from gastrointestinal and exotic diseases such as dysentery, typhoid fever and cholera, but a risk of respiratory ailments due to irritants and molds. Vaccination against enteric illness was discouraged. There were public education campaigns to prevent injury from drowning, electrocution, carbon monoxide poisoning, falls, and from re-entering unsafe structures. This information was conveyed to physicians and medical personnel throughout the University Health System in eastern North Carolina. ECU's Student Health Services adapted this monograph for its students and staff.

In order to allay the public's fears, and to respond quickly to any outbreak of disease, a surveillance system was implemented in Pitt County. The diagnoses for all patients seeking care at the PCMH Emergency Department, selected outpatient medical facilities, and Pitt County's community shelters were recorded by personnel from the Infectious Disease Section, the state health department, and CDC. Disease and injury rates were measured promptly and compared to rates from 1998. The data provided assurance that no outbreak of infectious disease was associated with post-hurricane flooding; further analysis will provide important information for planning for future flood disasters.

News Media

The local media provided extensive coverage of the disaster. Because of the broadcast media's ability to disseminate information quickly to the community, local public health authorities and a core group of PCMH physicians became frequent guests on regional television and radio stations. Through these broadcasts, they were able to rapidly dispel rumors of disease outbreaks, and to provide timely public health information. Because much of the region had no electric power, some television broadcasts were simulcast on local radio. In Greenville, newspapers solicited questions from its staff and readers, and then printed responses from local public health authorities. Articles giving specific public health advice were made available at local distribution sites for ice, food, water, and building supplies.

Summary

The financial impact of Hurricane Floyd on the medical community is still being tabulated. Initial estimates indicate a $5.8 million loss to UHS in operating revenue. Additional hospital costs include $568,000 for overtime pay, $310,000 for special equipment including helicopters and general supplies, and $1.2 million in"bonus pay" to the hospital's 6000 employees.[8] The ECU School of Medicine suffered losses estimated at $3.6 million, including lost revenue, overtime, and salaries paid when clinics and services were shut down.[8] Most private offices suffered from lost revenues and occasionally from flood damage to property.

Hurricane Floyd was the most costly disaster to hit Eastern North Carolina and the Mid-Atlantic United States. The medical community and its patients were severely challenged from the terrible effects of flooding, but the collaborative efforts of a great number of individuals and a spirit of teamwork came together to provide continued health care to the region. It is very likely that the preventive measures enacted both before and after the storm averted illness and injury, and saved lives. Ingenuity, innovation, and optimal use of available resources allowed Pitt County Memorial Hospital and its surrounding medical community to stay in operation. We have learned a great deal from these experiences that will help us plan for future natural disasters. ❐

Note: In our efforts to provide insight into a tragedy of this magnitude, we likely neglected to mention the efforts of many individuals and groups. We apologize for any inadvertent omissions.

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A Seizure in the Tobacco Field

Green Tobacco Sickness

Marian Swinker, MD, MPH, and John T. Meredith, MD, FACEP

Tying tobacco leaves on a frame for curing. Rural North Carolina, circa 1940. Photograph courtesy of the Durham County Library Archives, Durham County Library, Durham, North Carolina.

The Patient

In July, a 20-year-old Hispanic male migrant farm worker, harvesting tobacco for the first time, suffered a generalized, tonic-clonic seizure in the tobacco field. The seizure had stopped by the time Emergency Services personnel had arrived, but the patient was postictal. His pulse rate was 120 beats/min, respiration 24/min, and blood pressure 140/50. During transport to the Emergency Department, he was given 5 mg of diazepam intravenously and, as a precaution, oxygen via non-rebreather mask. Pulse oxymeter showed 100% saturation of hemoglobin. Capillary blood glucose was 98 mg/dL. He vomited twice en route.

In the Emergency Department, he was found to be a well nourished, Spanish-speaking young man, in no acute respiratory distress but actively vomiting. He was wearing no shirt, only shorts and shoes. He complained of a headache and abdominal cramps. He denied recent alcohol or recreational drug ingestion or use of any stimulant. There was no history of previous seizures or head trauma. He was breathing at a rate of 22 breaths/min; his pulse was 80 and blood pressure,

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Table. Differential Diagnosis of Green Tobacco Sickness (GTS)*

Signs and Symptoms	GTS	Heat Stress	Pesticide Poisoning
Weakness	+	+	+
Nausea/Vomiting/Diarrhea	+	+	+
Dizziness	+	+	+
Tachycardia	+	+	+
Bradycardia	+	-	+
Miosis	+	-	+
Secretions	+	-	+
Fever	-	+	-

*Personal Communication, Vickie Brandt, RN, Kentucky Community Partners for Healthy Farming, University of Kentucky

114/58. A thorough general physical was normal except that the palms and fingernails were coated with a sticky, light brown gummy material and the lower legs and right axilla showed multiple superficial abrasions. On neurological examination he had no facial weakness, the tendon reflexes in upper and lower extremities were normal and symmetrical, as was motor strength in all extremities. Perception of sharp and dull touch was normal; there was no pronator drift, and the Babinski response was negative.

He was given intravenous fluid at a rate of 200 cc/hr and 25 mg of intravenous promethazine, after which there was no further emesis. His complete blood count, serum electrolyte, blood urea nitrogen, creatinine, and glucose concentrations, and urinalysis were all normal. A computerized tomograph of the head showed no intracranial masses, bleeding, or midline shift.

The gummy residue was washed from his hands with soap and water. The abrasions on the lower legs and right axilla were washed in the same manner. After six hours of observation, during which he had no further seizures, he was discharged from the Emergency Department with a diagnosis of acute nicotine toxicity secondary to green tobacco exposure. He was advised to wear gloves and a shirt and long pants when picking tobacco.

Discussion

Nicotine is a liquid alkaloid present in tobacco leaves at a 1-6% concentration.[1] It is readily absorbed through exposed skin, and initially stimulates peripheral autonomic ganglia. Later it produces blockade of autonomic ganglia and skeletal muscle neuromuscular junctions, and direct (central nervous system) effects.[2] Symptoms of acute nicotine intoxication include salivation, sweating, dizziness, nausea, vomiting or diarrhea, muscle fasciculations, cramping, and weakness. Both parasympathetic and sympathetic responses may be seen: initial tachycardia and hypertension often being followed by bradycardia and hypotension. Central nervous system effects include headache, confusion, agitation, seizures, or loss of consciousness.

Green tobacco sickness is an occupational illness caused

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by absorption of nicotine through skin exposed to wet tobacco leaves. It occurs throughout the world in tobacco-growing areas.[3] The median time from starting work with tobacco leaves to symptom onset is about 10 hours, but this varies widely.[3] The almost universal symptoms of weakness, nausea, vomiting, diarrhea and dizziness may be confused with pesticide poisoning or heat stress illness (Table). The occupational history (for example, whether the patient was harvesting tobacco or spraying pesticide) may help to distinguish among the possibilities.

Since its recognition in the 1970s, no fatalities have been ascribed to green tobacco sickness, but it may play a role in cardiovascular disease and death.[4] Certainly, poisoning with concentrated forms of nicotine has led to vascular collapse, arrthythmias and death.[2] Young workers and those who do not smoke or use tobacco may be may be at more of a risk for green tobacco sickness: tobacco use is thought to offer weak protection by inducing tolerance.[3]

Green tobacco sickness is self-limited, usually lasting 1 to 2 days. There is no antidote, so treatment is supportive (for example, intravenous fluids for hypotension, antiemetics; benzodiazepine anticonvulsants, or antiarrhythmic agents such as atropine). Ipecac is contraindicated because it lowers the threshold for seizures. The diagnosis can be confirmed by measuring nicotine concentration in the serum or urine, but its half-life is only 3-4 hours,[4] so the results may be misleading. Cotinine, the major nicotine metabolite, has a half-life of 36 hours, and it is more useful (except in tobacco users who carry a baseline level of cotinine).

The risk of green tobacco sickness is increased by handling tobacco that is wet from rain or dew. Repeated daily exposure over more than a week,[4] such as during harvesting, may also increase the risk. The condition is preventable by use of protective clothing and by avoiding skin contact with wet tobacco. However, water-resistant clothing and rubber gloves, which provide an impermeable barrier to nicotine, increase the risk of heat stress, so ordinary shirts, trousers and cotton gloves are recommended. When clothing becomes wet from environmental dampness or sweating, it should be changed to maintain an effective barrier.

In North Carolina, tobacco may be handled during early summer (if flower tops are removed manually). From early July through October tobacco leaves are harvested as they mature, from bottom to top of the plants, but most harvesting is now mechanized, so contact with leaves occurs during boxing or racking of leaves. Our patient's case was typical in that there was exposure of a large area of unprotected skin, allowing nicotine absorption. He was new to tobacco handling, so had presumably not developed tolerance to nicotine, but we did not record whether he personally used tobacco. The best treatment is avoidance of poisoning: in addition to wearing gloves, long pants and a full shirt, workers picking or handling tobacco leaves should clean their hands frequently. Field workers often accomplish this by rubbing off the sticky tobacco plant gum with field dirt. ❐

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Non-Remembrance of Things Past

Ginkgo Biloba for Memory Loss

Ronald B. Mack, MD

Marcel Proust (1871-1922) wrote *A la recherche du temps perdu* (published in English as *Remembrance of Things Past*), a collection of seven novels based on the author's life told psychologically and allegorically.[1] The author, scion of a prominent French family (his father was an eminent physician), suffered from asthma from the time he was nine years old until his death. A semi-invalid, he became deeply devoted to his mother—and vice versa. When she died in 1905 Proust's life was shattered. He spent the rest of his days in a sound-proof apartment, withdrawn from society, wrapped in introspection, writing his timeless works.[2]

One of the most enduring outcomes of the *Remembrance* was to make the Madeleine famous. As memorably described in in the volume entitled *Swann's Way,* it was the look and smell of this little French tea-cake that triggered Proust's seven-volume flood of memory and nostalgia. For stimulating memory, this tea-cake had to be more delectable than Ginkgo *biloba.* If you have trouble remembering things past, current, or yet to come, however, current cultural trends suggest that ginkgo will help you recall the was that was.

The Oldest of Trees

Ginkgo *biloba* is a star in the current firmament of herbal remedies. It is alleged to increase blood flow to the brain, heart, and extremities, to relieve impotence, and to improve memory and brain function in the early stages of Alzheimer's disease.[3] In Europe, it is the herbal medicine most often prescribed by pharmacists and physicians. It is becoming more and more popular in this country, and is often advertised in the lay press, especially on television.

Although it looks to Americans like a modern addition to the armamentarium of alternative medicines, this herb is not new at all. Ginkgo is the oldest living tree genus, tracing its roots (pun intended) to the Triassic Period of the Mesozoic Era, when dinosaurs roamed the earth and the Chicago Cubs were last in the World Series. (Actually, the Cubs last appeared in the World Series in 1945, when I was in the Navy, far, far away. They were in the Series because millions of other young men, including major league ball players, were also far, far away—but that is another story.) In any case, the ginkgo is a very hardy tree and remarkably resistant to damage from insects, parasites, or pollution. Following the atomic bombing of Hiroshima and Nagasaki in 1945, ginkgos were the only trees that sprouted new leaves from their blackened stumps the following spring.[4] You might have suspected as much since it has been around for over two hundred million years. Ginkgo was declared "good for the heart and lungs" in China's first great herbal, known as the *Pen Tsae Chings* and attributed to the legendary emperor, Shun Nung.[5] The sage allegedly wrote this text circa 3000 BC! And he reputedly tested herbs on himself. You guessed it: he died after eating too much of a plant that subsequently was found to be poisonous.

Remarkable claims are made for the therapeutic benefits to be derived from eating ginkgo. They include the amelioration of vascular insufficiency in all the arteries, veins and capillaries of the body, thus affecting conditions like stroke, Alzheimer's Disease, memory loss, disequilibrium, loss of concentration, intellectual deficit (the acquired kind, we assume), decreased blood supply to the lower extremities, and, of course, impotence—or, as it is now more politico-correctly called, "erectile dysfunction." Many proponents state that the primary therapeutic benefit of ginkgo is the increase of blood flow into areas deprived of that vital fluid. Included in the list of proposed benefits offered is even improved hearing because of enhanced blood supply to the auditory apparatus.

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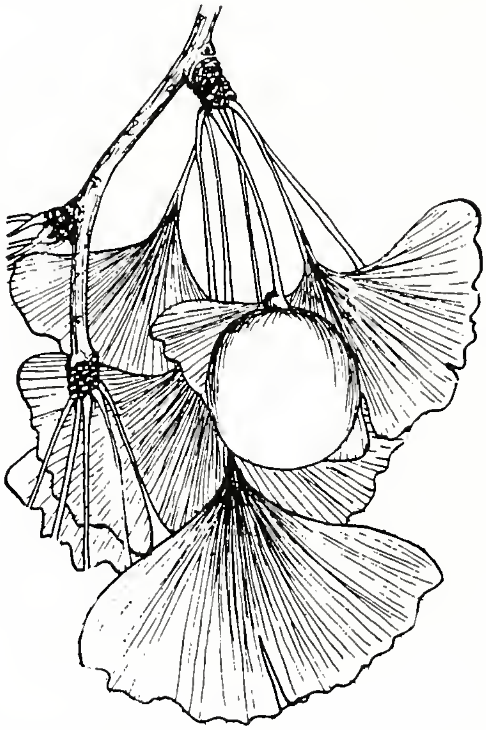
How Does Ginkgo Do Its Job?

How, you ask, does this ancient flora perform such amazing feats? It is alleged that the leaves of G. *biloba* contain terpenoids and flavonoids, which inactivate oxygen-free radicals, resulting in vasodilation and antagonizing the effects of the platelet-activating factor.[6,7] These salutary effects are alleged to depend on the proper balance of its two active ingredients, flavone glycosides and terpene lactones. According to the German Federal Health Agency, ginkgo is approved for over-the-counter sale if the product contains 22-27% flavone glycosides and 5-7% terpene lactones.[3] Users should check these numbers on the package of the ginkgo product they want to purchase.

The flavone glycosides are a type of flavoid—substances found in many plants and fruits, especially citrus fruits. They can function as "antioxidants," a term now popular amongst physicians and alternative practitioners as well. Apparently, we need antioxidants to thrive and especially to thrive into senior citizen status and beyond. Why is it so bad to have oxidants and why do we need antioxidants? According to the "free radical theory of aging,"[8] aging reflects permanent cellular damage from persistent and continuous attacks by chemical particles known as free radicals. Our cells normally have inherent defenses against such enemies—for example, glutathione peroxidase and alpha tocopherol (this latter chemical is Vitamin E, in case you forgot, and that is why your own doctor may have recommended that you take this medication, now that your odometer has more miles on it).



Gingko *biloba*. Adapted from Maino & Howard, Ornamental Trees, U. California Press, 1972.

Free radicals are not mysterious. They are merely molecules that are missing an electron and are frantically searching for another molecule from which they can steal an electron. In my old 'hood, I am sure the guys would have tried to steal electrons, if they knew what they were. In any case, the role of antioxidants is to neutralize the scavenging free radicals by giving up one of their electrons. The free radicals are thereby returned to normal and stop their cellular marauding. Antioxidants are thus chemical ninjas that seek and destroy free radicals and avert their damaging effects. Antioxidants are very good at what they do but are not perfect; many free radicals are not destroyed and thus cellular "junk" accumulates, ultimately causing more disease and less longevity. Flavone glycosides also, it is believed, reduce the "stickiness" of platelets, the property that causes platelets to adhere to each other and thus causes blood to coagulate.[3] By reducing stickiness, these compounds improve circulation and prevent the formation of blood clots. Flavonoids protect blood vessels by increasing the strength of capillary walls, reducing inflammation, and preventing blood cells and proteins from oozing out of blood vessels.

The other major ingredient in Ginkgo *biloba* extract is the terpene lactones, present in the form of bilobalides and ginkgolides. These chemicals offset processes that lead to the formation of unwanted blood clots; they, too, improve circulation to the brain and other vital organs, increase the supply of oxygen to the tissues, and enhance glucose uptake. Lactones protect nerve cells from damage caused by brief periods of oxygen deprivation, lessen the risk of incurring . . . of incurring . . . a cerebrovascular accident. (Excuse me, I think I just had an incident: my grand-daughter called about a Madame Alexander doll, selling for $175, and I guessed I blacked out for a few seconds.) To the lactones go the credits for ginkgo's alleged ability to improve memory and memory functioning. In an era of neurotransmitter knowledge and neuroreceptors, it is gratifying that the ginkgo mavens believe that this herb works through interaction with receptors and via enzyme inhibition.

The Dark Side of Ginkgo

The kinetics of ginkgo toxicity may be of interest to some readers. The onset of central nervous system action occurs one hour after ingestion of a usual dose (say, 40 mg). Peak absorption occurs by 2-3 hours and the total duration of action is 7 hours. Between 70-100% of ingested ginkgo becomes bioavailable, which is not bad.[6] Clinical adversities – and there are many — include palpitations, dizziness, headache, restlessness, atonia, seizures (reported in children), subdural hematomas, stomatitis, cheilitis, urticaria, vomiting, diarrhea, proctitis, and hyphema.[6] (No thanks, I pass. Do not give me any. I have most of those symptoms already.) Any patient who develops neurological symptoms after ingesting ginkgo should be admitted for observation. If the patient is seen soon after ingestion, giving activated charcoal by mouth might be helpful. There is, of course, no specific antidote. If you are confronted in the Emergency

Department with a child who has eaten ginkgo seeds or kernels and has CNS abnormalities, one author suggests giving pyridoxine, believing that the adverse effects could be caused by 4-0-methylpyridoxine, an antipyridoxine compound.[9]

One of the more worrisome aspects of taking ginkgo is that it inhibits platelet activating factor and thus may cause bleeding. This side-effect is even more frightening in patients who also take anticoagulants like warfarin. Some older people take ginkgo because they believe it enhances memory, improves circulation, and enhances sexual prowess, but these are the same people who also take drugs like warfarin.[10] The public needs more warning than it is getting at present. The American Herbal Product's Botanical Safety Handbook[11] classifies this herb as *2-d*, which means it may potentiate pharmaceutical MAO inhibitors.

Where Am I? Who Are These People?

Now where was I? I seem to have forgotten my point. ("Dear, is it time for your little ginkgo pill?") Gosh. I feel better now. In any case, let us remember Proust once more. *A la recherche du temps perdu* is considered a major achievement of modern fiction and has much influenced the novels of our century. The story concerns the irretrievability of time lost, the emptiness of love and friendship, the loss of innocence through experience, and the triumph of sin and despair. In spite of so many depressing thoughts, Proust concluded that every day of life is important, full of moral joy and beauty. He believed that, though these positive features could be lost by the faults inherent in human nature, they are, ultimately, recoverable. My favorite quote of his reads: "The real voyage of discovery consists not in seeking new landscapes, but in having new eyes."[12] ❐

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Fouling Our Nest

Geographic and Temporal Patterns of Toxic Industrial Chemicals Released in North Carolina, 1988-1994

Diane Marie M. St. George, PhD, Steven B. Wing, PhD, Denise Riedel Lewis, PhD

Every year, manufacturing plants discharge large amounts of toxic chemicals into the environment. For example, in 1994, over 2 billion pounds of such waste were released nationwide.[1] Since 1987, large manufacturers have been required by law to report annually on selected chemicals transferred off site or released into air, land, water or underground injection wells.[1] Chemicals known or likely to cause significant adverse acute or chronic health effects (including cancer, congenital anomalies, reproductive effects, neurological disorders, and heritable genetic mutations) and those posing a significant threat to the environment must be reported. In 1994 the list included 343 chemicals in 22 categories. The annual reports are compiled by the United States Environmental Protection Agency (EPA) into a database known as the Toxics Release Inventory (TRI).

The TRI does not assess actual human exposure, only the type and amount of material released into the environment. Released chemicals may or may not affect residents of nearby communities, but individuals living near sites of release are at risk of exposure by ingestion, absorption or inhalation.[2] This means there is a continuing need for surveillance of emissions (and the populations at risk), especially in states with extensive manufacturing industries. North Carolina is such a state and is among the leaders in TRI emissions. In 1994, NC ranked eighth nationally in numbers of facilities and sixth in terms of mass of air, water, and land releases.[1]

Because of the potential health consequences of toxic chemicals in the environment, we evaluated the temporal trend and the geographic distribution of TRI facilities and emissions in North Carolina in order to estimate the potential for human exposure throughout the state.

Methods

We used the US EPA TRI database (available on CD-ROM) to gather data on manufacturing facilities. US manufacturers must report to the TRI if they employ more than 9 full-time staff, if they manufacture or process more than 25,000 pounds or use more than 10,000 pounds of a reportable chemical in a calendar year, and if they are privately owned entities covered by Standard Industrial Classification (SIC) codes 20-39. Since 1994, all federal facilities must also report. We included data from any manufacturing facility in North Carolina that submitted at least one chemical report to the TRI database between 1988-1994. Eight facilities were subsequently eliminated from the dataset; two because they were federal facilities and six because they were wastewater treatment plants rather than privately owned manufacturers.

Temporal patterns of TRI releases and numbers of facilities were qualitatively evaluated by examining graphs of releases over time. The variability in the numbers of facilities was negligible, therefore we estimated only the percent change in quantities released over the seven-year period.

Manufacturing facilities throughout the state of NC were located on maps using Geographic Information Systems software (ArcView version 3.0). The manufacturing site map was overlaid with data on state region and urbanicity (calculated using a 10-point rural-urban continuum code—see Table 1). The 10-point continuous code is more appropriate than a categorical rural/urban/suburban classification because it takes into account US Office of Management and Budget metropolitan/non-metropolitan designations, population size, and proximity to populous regions.[3]

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Table 1. Rural-Urban Continuum Code (RUCC)

0 = Metropolitan-Central counties of metropolitan areas of 1 million population or more
1 = Metropolitan-Fringe counties of metropolitan areas of 1 million population or more
2 = Metropolitan-Counties in metropolitan areas of 250,000-1 million population
3 = Metropolitan- Counties in metropolitan areas of fewer than 250,000 population
4 = Non-metropolitan-Urban population of 20,000 or more, adjacent to a metropolitan area
5 = Non-metropolitan-Urban population of 20,000 or more, not adjacent to a metropolitan area
6 = Non-metropolitan-Urban population of 2,500-19,999, adjacent to a metropolitan area
7 = Non-metropolitan-Urban population of 2,500-19,999, not adjacent to a metropolitan area
8 = Non-metropolitan-Completely rural or <2,500 urban population, adjacent to a metropolitan area
9 = Non-metropolitan-Completely rural or <2,500 urban population, not adjacent to a metropolitan area

The region of the state was of interest because North Carolina consists of four regions: Mountains, Piedmont, Coastal Plain, and Tidewater. Each region has unique physiographic, economic, and sociodemographic attributes.[4,5] The Mountain region (part of the Appalachian chain) is largely rural. The population is predominantly White and has the highest proportion of adults aged 60 and older among the four regions. The Piedmont contains 44% of the land area and the majority of the population. It is the most urban region and the hub of the state's commercial and governmental activity. Median family income is highest in the Piedmont. The Coastal Plain, lying immediately east of the Piedmont, is mainly rural, has the highest proportion of African Americans, and has the lowest median family income in the state. The Tidewater region borders the Atlantic and includes the barrier islands of the Outer Banks. It has a large minority and older adult population.

Results

From 1988 through1994, 1,386 manufacturing facilities submitted a total of 21,538 chemical reports to the TRI. The number of chemicals reported varied from 1 to 166 per facility (mean = 16); 9% of the facilities submitted only a single report during the seven-year period; 46% submitted 2 to 10 reports; and 45% submitted more than 10 reports each.

Table 2 shows a statewide ranking of the primary SIC codes reported by the TRI facilities. The most common type of manufacturing activity in the state was textile, followed by chemical, furniture and then plastics manufacturing. Together these four accounted for over half of all manufacturing facilities.

Table 2. Primary Standard Industrial Classification (SIC) codes for NC TRI facilities

SIC code and name	Number
22: Textiles	206 (15%)
28. Chemicals	196 (14%)
25: Furniture	158 (11%)
30: Plastics	149 (11%)
20: Food	93 (7%)
34: Fabricated metals	86 (6%)
36: Electrical equipment	84 (6%)
35: Machinery	63 (5%)
37: Transportation equipment	58 (4%)
24: Lumber	55 (4%)
32: Stone/clay/glass	45 (3%)
33: Primary metals	43 (3%)
27: Printing	31 (2%)
26: Paper	28 (2%)
21: Tobacco	27 (2%)
39: Miscellaneous	18 (1%)
38: Measurement/photo	17 (1%)
23: Apparel	12 (1%)
31: Leather	7 (<1%)
29: Petroleum	6 (<1%)
No codes 20-39	4 (<1%)
Total	1386

North Carolina TRI facilities released approximately 365,000 metric tons (one metric ton = 2,204.6 pounds) of chemicals into the environment between 1988 and 1994. Most (79%) of the releases were into the air. One-fifth of the total mass (approximately 73,800 metric tons) was deposited on land and only 1% (3,400 metric tons) was discharged into

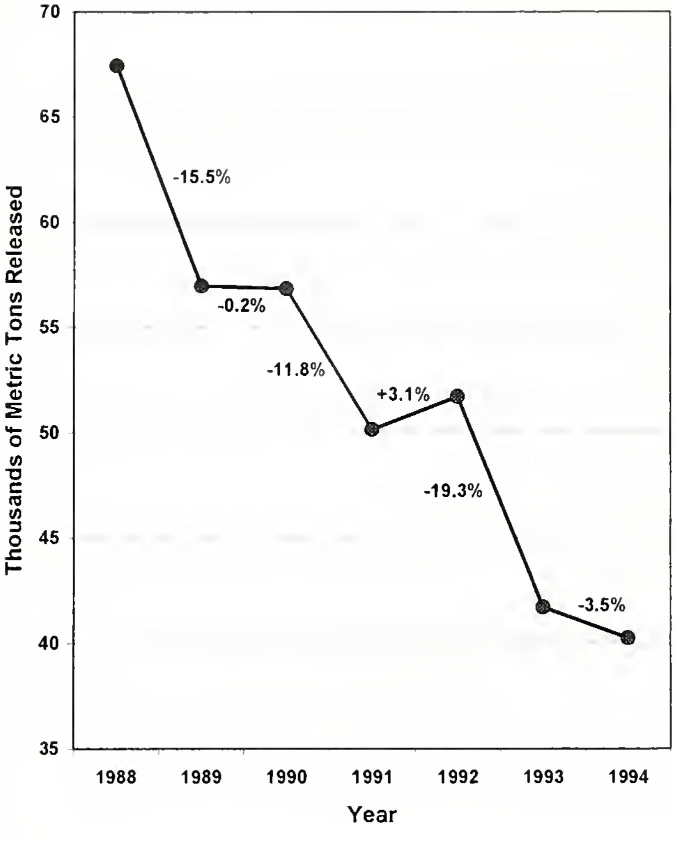

Figure. Yearly emission of toxic material in North Carolina[1]

bodies of water. There was a substantial, linear decrease in reported emissions over the study period (Figure). Between 1988 and 1994, total reported emissions decreased by 40.3%.

Ninety-one of North Carolina's 100 counties filed at least one TRI report during the study years; nine filed none. Among counties with facilities, the average number of facilities per year (that is, the total number of facilities reporting divided by the seven years in the study period) varied from 0.14 to 78.3. Half of the counties averaged fewer than 5 facilities per year. The number of facilities and quantity of reported emissions varied according to the Rural-Urban Continuum Code ranking of counties (Table 3). In general, metropolitan counties and those adjacent to them released more emissions and reported more facilities than rural counties.

Table 4 documents the distribution of TRI facilities and emissions by region. The Piedmont region had the most facilities per county and ranked second in average amount of material reported released per county. It was also the most populous region, with greater than half the population of the state. Interestingly, the Tidewater region ranked last in terms of number of facilities per county but first in terms of reported releases per county. There are 18 counties in that region; six had no manufacturing facilities, and three of the remaining 12 accounted for 96% of the material reported released in the region. These three

Table 3. Number of TRI facilities and quantity of reported emissions by Rural-Urban Continuum Code, 1988-1994

RUCC*	No. Counties	No. TRI Facilities	Facilities/County	Reported Releases†	Releases†/County
0	3	177 (13%)	59.0	18,926 (5%)	6,309
1	4	70 (5%)	17.5	8,004 (2%)	2,001
2	18	526 (38%)	29.2	114,323 (31%)	6,351
3	10	164 (12%)	16.4	87,779 (24%)	8,778
4	7	143 (10%)	20.4	14,690 (4%)	2,099
5	1	9 (<1%)	9.0	3,617 (1%)	3,617
6	23	200 (14%)	8.7	104,541 (29%)	4,545
7	12	67 (5%)	5.6	8,771 (2%)	731
8	9	12 (1%)	1.3	284 (<1%)	32
9	13	18 (1%)	1.4	4,116 (1%)	317
TOTAL	100	1386 (100%)	13.9	365,051 (100%)	

*See Table 1 for definitions

†Metric tons of toxic materials released over 7 years

Table 4. Regional distribution of TRI facilities and quantity of reported emissions, 1988-1994

Region	Counties	Population*	TRI Facilities	Facilities/Co.	Reported Releases[†]	Releases[†]/Co.
Tidewater	18	0.7	64 (5%)	3.6	130,664 (36%)	7,259
Coastal	23	1.3	210 (15%)	9.1	49,162 (14%)	2,137
Piedmont	35	3.7	902 (65%)	25.8	125,151 (34%)	3,576
Mountain	24	0.9	210 (15%)	8.8	60,074 (17%)	2,503
Total	100	6.6	1386	13.9	365,051	

*Millions

[†] Metric tons of toxic materials released over 7 years

counties, the 1st, 2nd, and 4th leading releasers in the state, had 34 facilities, half of which were chemical plants. Chemical plants, which released an average of 800 metric tons of waste apiece, were second only to paper factories (1,400 metric tons) in total amounts released, and ahead of leather (400 metric tons) and furniture (300 metric tons) industries.

Discussion

This paper documents the geographic and temporal patterns of the release of toxic chemicals from North Carolina manufacturing facilities from1988 through 1994. The findings provide a framework for understanding the potential impact of such releases on the population of North Carolina. The actual impact will depend on a number of factors including the distribution of manufacturing facilities relative to the population; the behavior of individual chemicals in the environment; the magnitude, methods, rates and routes of release chemicals; the climatic conditions at the time of release; the topography of the landscape; and population behavior. We evaluated only one component, the spatial distribution of facilities and emissions relative to the distribution of populations.

We found that 1,386 manufacturing facilities reported emitting over 365,000 metric tons of toxic chemicals into the environment over a seven-year period. That number needs to be interpreted in context. For instance, North Carolina ranks ninth nationally in number of facilities but sixth in the mass of material released, implying a relative excess of release. On the other hand, North Carolina has seen an overall reduction in yearly emissions since 1988. Part of this trend may reflect "phantom reductions" (paper decreases due to changes in accounting methods, or decreased production, or use of waste management techniques that do not require reporting).[6] A survey of 1,206 facilities reporting in 1989 and 1990 showed that about half the decrease in emissions was attributable to changes in production and reduction of waste production; 2.5% was due to changes in methods of measurement; and nearly half to unmeasured factors such as changed reporting requirements or reporting errors.[7] However, the magnitude of continuing emissions is still high enough to prompt concern about potential human exposure and harm.

We have attempted to evaluate the potential for human exposure by comparing the geographic distribution of the facilities and their emissions with the distribution of the population. Not surprisingly, these analyses show that urban areas have more facilities and more emissions, consistent with the previously identified positive relationship between population density and TRI-reporting facilities.[8-10] However, in other states more TRI facilities are located in rural areas. For instance, Indiana has rural areas with extensive industrial development and these areas tend to have high emissions of certain chemicals.[11] Discrepancies in geographic distribution of industry probably result in part from two forces driving industry siting: a need for access to transportation and a desire for cheap labor and cheap land.[12-15] Both can often be found in urban areas, but in some circumstances rural areas appear to afford more desirable sites.

The discrepancy between number of facilities and relative emissions across regions (Table 4) implies that research into the population impact of TRI manufacturers should consider both the numbers of facilities and the amount of toxic releases. It may seem obvious that different facilities will emit differing amounts of chemicals, but some facilities that "manufacture, process or use" listed chemicals in amounts that exceed the reporting threshold may report zero emissions, because they estimate that none of the material was released into the environment. Still, the mere fact that the chemical is used means there is a potential for accidental release. The discrepancy between number of facilities and emission quantities highlights the fact that some industries represent more of an exposure threat than others. For instance, communities with paper and chemical plants, which have the largest reported releases, should be prime targets for surveillance measures.

The pattern of TRI facility distribution in the state of North Carolina suggests a direction for future public health efforts. First, manufacturing industries and toxic releases are located preferentially in metropolitan areas. Urban areas will bear careful monitoring, but surveillance must not be limited to those areas because that would miss rural communities with substantial manufacturing industry. Second, the TRI database can be used to monitor potential human exposure to toxic waste chemicals, but it is important to consider both the number of facilities and the quantity of emissions since either may point to areas of concern. Third, the amount of reported waste emissions has been declining, but these findings need validation. This means continued surveillance as a way of minimizing community exposures and evaluating the effects of changes in TRI reporting requirements. Fourth, research into actual as well as theoretical pathways through which waste travels from its source into human populations is crucial to making accurate quantitative estimates and in placing realistic values on the magnitude of risk borne by communities that host manufacturing facilities. Lastly, there remain a number of inadequately explored issues related to the socioeconomic and demographic composition of communities hosting TRI facilities. We need to evaluate the population characteristics and patterns of exposure that may place the most vulnerable among us at the highest risk. ❐

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Ephraim McDowell, Jane Todd Crawford, and the Origins of Oophorectomy

Connette P. McMahon, MSIV

Ovarian cancer kills more women in the US than all other gynecologic malignancies combined. In 1996, there were 26,700 new cases of and 14,800 deaths due to ovarian cancer. In contrast, there were 34,000 new cases of endometrial cancer in that year, but only 6,000 deaths from endometrial cancer; 15,700 new cases of cervical cancer and 4,900 deaths due to cervical cancer. The discrepancy in survival between ovarian, uterine, and cervical cancers is due to a number of factors, including difficulty in detection and poor response to treatment.

In the United States, the incidence of ovarian cancer is 20/100,000 women aged 30-50 years; the incidence is 50/100,000 women older than 50 years. The mean age at diagnosis is 59. Over their lifetimes, American women have a 1 in 70 probability of developing ovarian cancer.

The designation "ovarian cancer" covers several kinds of ovarian neoplasms, including those which arise from the mesothelium covering the ovary, those which originate from germ cells within the ovary, and those which arise from the cortical mesenchymal stroma of the ovary. Oophorectomy is the surgical mainstay of treatment for all types of ovarian cancer.

In 1595 Schench reported the case of an amenorrheic young girl with a large ovarian tumor, and that of another patient whose ovary contained hair, wax, pus, and fluid. Theden made the first recorded attempt at oophorectomy in 1771, but the first successful attempt at curative ovarian surgery occurred nearly 40 years later. That success is generally attributed to Ephraim McDowell who, despite never having completed his formal medical training, is considered to be the father of oophorectomy and abdominal surgery. Not the first to perform the operation, he nonetheless deserves credit for putting it securely into the surgical armamentarium.

Ephraim McDowell (1771-1830)

McDowell was born in Rockbridge County, Virginia, on November 11, 1771, the ninth of twelve children. He attended local schools in Virginia and, after his parents moved in 1783, in Danville, Kentucky. McDowell later studied medicine under the direction of a Dr. Humphreys of Staunton, Virginia, and, as was the practice for "well-trained" physicians of the day, pursued further medical studies at the University of Edinburgh, in 1793-1794. He returned to Kentucky and commenced a medical practice in Danville in 1795.

In December 1809 McDowell was asked to see in consultation Jane Todd Crawford (a cousin of Abraham Lincoln's wife) who was believed to be pregnant. Mrs. Crawford, born December 23, 1763, was 45 years old at the time. On examination per vagina McDowell felt nothing in the patient's uterus, and diagnosed an enlarged ovary as the cause of Mrs. Crawford's enlarged abdomen. He asked the patient to come to his home in Danville to have the ovary removed. In an act of remarkable faith and heroism, Mrs. Crawford traveled 60 miles by horseback in winter to undergo abdominal surgery without anesthesia.

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In a span of 25 minutes on December 25, 1809, McDowell, assisted by his nephew Dr. James McDowell but without benefit of anesthesia or today's antiseptics, successfully removed over 22 pounds of fluid and an ovarian tumor from the patient's abdomen. The surgery was successful, and Mrs. Crawford was walking around McDowell's home five days after her surgery. She lived for three more decades (the date of her death is uncertain, but is generally recorded as between 1841-1843). Much to his credit, McDowell realized the importance of adequate exposure of the surgical site, hemostasis, separation and removal of the tumor from normal tissue, the need to regulate body temperature by warming the patient's intestines before returning them to the abdomen, and closure of the abdomen.

McDowell recorded this first oophorectomy, together with two later cases, in "Three cases of extirpation of diseased ovaria" (see sidebar). McDowell was elected a member of the Medical Society of Philadelphia in 1817 and became a founder and trustee of Centre College of Kentucky. In 1825, the University of Maryland awarded him an honorary MD degree. He died in Danville on June 20, 1830. The Kentucky State Medical Society erected a monument in his memory in McDowell Park in Danville in 1879. The state of Kentucky donated a statue of McDowell, which was unveiled in the Statuary Hall of the U.S. Congress on March 3, 1929, where it can be seen today. ❒

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McDowell's Original Report of the Operation on Mrs. Crawford

"In December, 1809, I was called to see a Mrs. Crawford, who had for several months thought herself pregnant. She was affected with pain similar to labour pains, for which she could find no relief. So strong was the presumption of her being in the last stage of pregnancy, that two physicians, who were consulted in her case, requested my aid in delivering her. The abdomen was considerably enlarged, and had the appearance of pregnancy, though the inclination of the tumour was to one side, admitting of an easy removal to the other. Under examination, per vaginam I found nothing in the uterus; which induced the conclusion that it must be an enlarged ovarium. Having never seen so large a substance extracted, nor heard of any attempt, or success attending any operation such as this required, I gave to the unhappy woman information of her dangerous situation. She appeared willing to undergo an experiment, which I promised to perform if she would come to Danville (the town where I live), a distance of sixty miles from her place of residence. This appeared almost impracticable by any, even the most favorable conveyance, although she performed the journey in a few days on horseback.

"With the assistance of my nephew and colleague, James M'Dowell, M.D., I commenced the operation, which was concluded as follows: Having placed her on a table of the ordinary height, on her back, and removed all her dressing which might in any way impede the operation, I made an incision about three inches from the musculus rectus abdominis, on the left side, continuing the same nine inches in length, parallel with the fibres of the above named muscle, extending into the cavity of the abdomen, the parietes of which were a good deal contused, which was ascribed to the resting of the tumour on the horn of the saddle during the journey. The tumour then appeared in full view, but was so large that we could not take it away entire. We put a strong ligature around the fallopian tube near to the uterus; we then cut open the tumour, which was the ovarium and the fimbrious part of the fallopian tube very much enlarged. We took out fifteen pounds of a dirty, gelatinous looking substance. After which we cut through the fallopian tube and extracted the sack, which weighted seven pounds and one-half. As soon as the external opening was made, the intestines rushed out upon the table; and so completely was the abdomen filled by the tumour, that they could not be replaced during the operation, which was terminated in about twenty-five minutes.

"We then turned her upon her left side, so as to permit the blood to escape; after which, we closed the external opening with the interrupted suture, leaving out, at the lower end of the incision, the ligature which surrounded the fallopian tube. Between every two stitches we put a strip of adhesive plaster, which, by keeping the parts in contact, hastened the healing of the incision. We then applied the usual dressings, put her to bed, and prescribed a strict observance of the antiphologistic regime.

"In five days I visited her, and much to my astonishment found her engaged in making up her bed. I gave her particular caution for the future; and in twenty-five days, she returned home as she came, in good health, which she continues to enjoy."

**Exlect. Repert. Analyt. Rev. 1817:7:242-4, reprinted in Med. Classics 138:2:651-3.*

Smoking Cessation

"It's the Right Time"

by Kam L. Capoccia, PharmD, Adam O. Goldstein, MD, and Timothy J. Ives, PharmD, MPH

Each year, smoking accounts for more than 430,000 deaths nationwide. This equals 1 out of every 5 deaths. Smoking results in life-threatening diseases such lung or bladder cancer, chronic obstructive lung disease (COPD), emphysema, high blood pressure, heart disease, ulcers, and progression of asthma. Despite the fact that one of two smokers will die from their smoking, 47 million adults are still addicted to smoking in the United States. In this article, we will review different ways to help you quit using tobacco.

Deciding to quit smoking is the most important and first step for success. Research shows that if you have a quit date and a definite plan, you will increase the chances of quitting. It takes many people 4-5 times of trying to quit before final success. *Cutting down on the amount of cigarettes you smoke each day does not in most cases help you quit smoking.* Most people when they cut down inhale the remaining cigarettes more deeply, more quickly and longer, leading to even higher levels of some cancer-causing agents. Therefore, make a quit date, and on the day you quit, do not smoke any more cigarettes.

Because nicotine is addicting, medications—both prescription and over-the-counter— may help you quit smoking. Use of medication may increase your chance of successfully quitting smoking by 25%. In the table on the next page, and in the paragraphs below, we list and describe the most important products available to help you quit smoking or chewing tobacco. It is important to ask your doctor about the specific dosages most appropriate for you.

Nicorette is a non-prescription, nicotine-based gum which is available in 2mg and 4mg strengths. The gum should be chewed—with breaks—over 30 minutes. It can be held in the cheek when not being chewed. It must be chewed slowly for the proper effect; one piece of gum can be chewed every 1-2 hours if needed. After 2-3 months of using the gum, patients should start weaning themselves. Common side effects include mouth soreness, hiccups, jaw ache and heartburn.

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Table. Common aids for smoking cessation, with dosages, costs, and prescription status.

Product	Availability		Dosages	Costs
	over-the-counter	prescription		
Nicorette gum	X		2, 4 mg	108pieces $50-60
Nicotrol patch	X		15, 10, 5 mg	14 patches $50
Habitrol patch		X	21, 14, 7 mg	14 patches $50
Nicoderm CQ patch	X		21, 14, 7 mg	14 patches $50
Prostep patch	X		22, 11 mg	14 patches $50
Nicotrol nasal spray		X	0.5 mg/spray	1 unit $45-50
Nicotrol inhaler		X	4 mg/cartridge	42 cartgs. $45-50
Zyban		X	150 mg/tab	60 tablets $110

Nicotrol, Habitrol, Prostep and *Nicoderm CQ* are nicotine patches. Patches should be applied to a clean, dry, hairless area of the body. The site of application should be rotated daily. Nicotrol should be used for 16 hours each day (removed at bedtime) while Nicoderm CQ, Prostep, and Habitrol can be worn all day and a new patch placed every morning. All the patches except Habitrol are available without a prescription. Most people should start with the higher doses and change patch size every 2-4 weeks. Advantages of the patch over the gum include ease of applying the patch once a day, no taste disturbances, and a weaning schedule that allows a decrease in the dose while still providing a continual level of nicotine. Some people also find that combining the patch and the gum is helpful.

Nicotrol NS, a nasal spray, is a prescription product and should be used under the supervision of a physician. Two puffs of the spray—one into each nostril—give a total dose of 1 mg of nicotine, which is absorbed though the nasal mucosa. This allows for a rapid reduction in the craving for nicotine. During the initial week of treatment, runny nose, watery eyes, sneezing, coughing, nasal and throat irritation can occur.

Nicotrol Inhaler, also a prescription product, is an oral inhaler designed to mimic the hand-to-mouth motions of smoking and the sensation of smoke on the back of the throat (menthol taste). The inhaler resembles a cigarette. The cartridge containing the nicotine (about 2 mg of nicotine is absorbed per cartridge) is inserted into the mouthpiece, and the air inhaled through the mouthpiece is then saturated with nicotine. Patients can take frequent puffs or deep inhalations to titrate themselves to the amount of nicotine desired. Most people use at least 6 cartridges a day initially and are off the product after 3 months. Side effects of the inhaler include throat and mouth irritation, taste irregularities, and coughing.

Zyban (buproprion) is a non-nicotine prescription drug that is approved for the use of smoking cessation. Zyban Advantage Plan is a smoking cessation treatment program that offers educational materials and support via a hotline number that is accessible 24 hours a day. Zyban reduces the urge to smoke and relieves the withdrawal symptoms of irritability, frustration and anxiety. Treatment with one 150 mg tablet should begin *one week before* the planned quit date. After 3 days at 150 mg/day, increase the dose to 300 mg/day if there are no side-effects. One week after starting the medication, you must quit smoking cigarettes entirely. One study demonstrated a higher quit rate for Zyban plus a patch. The most common side effects seen with Zyban include dry mouth and insomnia. Zyban should not be used in patients with a history of seizures, anorexia, or in patients who are taking a monoamine oxidase inhibitor (MAOI). The use of other prescription agents may interfere with Zyban. It is very important to consult with your physician and pharmacist before taking this product.

With all the above-mentioned products, it is essential to adopt a good plan for smoking cessation. This plan includes: 1) Making a quit date, 2) Coming up with alternative behaviors to do other than smoking (such as drinking a glass of water, eating sugarless candy, meditating, calling a friend, writing a letter, etc.), and 3) Rewarding yourself after you have successfully quit for a month.

It is well known that smoking is the #1 preventable cause of death in the United States. However, the reason why people continue to smoke is simple. Nicotine is addictive. This addiction can be overcome through education, behavioral changes, and the proper use of medications. Physicians, pharmacists, and specific organizations can provide the support and resources to aid in smoking cessation.

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Organizations That Can Help

American Cancer Society
(800) ACS-2345 (http://www.cancer.org)
Fresh Start Program for group classes for smokers who want to quit
Contact: 1-800-282-4914

American Lung Association
(800) LUNG-USA (http://www.lungusa.org)
Freedom from Smoking and Teen Smoking Cessation Programs
Contact: 1- 919-832-6567

North Carolina Tobacco Prevention and Control Branch
1915 Mail Service Center
Raleigh, NC 27699
919-733-1343

Survivors and Victims of Tobacco Empowerment Project
31 College Place, 13A
Asheville, NC 28801
http://www.main.nc.us/save
Contact: 1-888-8-Voices

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Running the Numbers

A Periodic Report to North Carolina Physicians and Their Patients
About Current Topics in Health Statistics

Paul A. Buescher, PhD, Editor

Did This Pregnancy End with a Live Birth or a Fetal Death? Reporting Definitions for Vital Statistics

The World Health Organization (WHO) defines a live birth as "the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy, which, after separation, breathes or shows any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or any definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached." This definition has been adopted by the National Center for Health Statistics and the State of North Carolina. This means that a Certificate of Live Birth should be completed for each baby born alive by the above definition. If the baby subsequently dies, then a Certificate of Death must be completed. If, after at least 20 weeks of pregnancy, the fetus is not born alive, then it is considered a fetal death in North Carolina and a Report of Fetal Death must be completed.

Approximately one-half of infant deaths occur in the first day of life. These, like all deaths occurring less than 28 days after birth, are called neonatal death. Deaths occuring between 28 and 365 days after birth are called postneonatal. These definitions and reporting requirements have been used by North Carolina for almost 50 years.

The 20th edition of *Williams' Obstetrics* states that "fetuses weighing less than 500 grams are not usually considered as births, but rather as abortuses, for purposes of vital statistics." This is not consistent with WHO and North Carolina reporting requirements. There is no birth weight or gestational age minimum for considering a delivery as a live birth in North Carolina, nor is potential viability an issue. Any delivery at which there are signs of life as defined by WHO should be reported as a live birth. Health statisticians sometime compare *perinatal* death rates (for example, fetal deaths plus neonatal deaths) to reduce differences due to classification.

The reporting requirements for live births are consistent throughout the United States; however, some states have different gestational age or birth weight cutoffs for reporting fetal deaths. If physicians use consistent criteria for defining live births, then differences in infant mortality rates between states will reflect true differences in infant mortality risk. In the interest of effective public health, we must maintain high standards of reporting for our state vital records system. This means that physicians should adhere strictly to the WHO guidelines for reporting live births and fetal deaths.

From the State Center for Health Statistics
www.schs.state, nc.us/SCHS
North Carolina Department of Health and Human Services

Endoscopic Ultrasound

State of the Art

Kevin M. McGrath, MD, and Paul S. Jowell, MB, ChB

Endoscopic ultrasound (EUS) provides detailed images of lesions within and adjacent to the gastrointestinal wall. High frequency (5.0-20.0 MHz) ultrasound transducers mounted on the tip of an endoscope give detailed images of the intestinal wall and adjacent structures, but only to a depth of 1-5 cm. In contrast, trans-abdominal ultrasound uses low frequency sound waves (2.5-5.0 MHz) to visualize intra-abdominal organs. The low frequency sound waves penetrate tissue better, but resolution is less defined. EUS was originally designed to image the pancreas, but new uses continue to evolve. In this article we will discuss the ways in which EUS is currently used in the gastrointestinal tract (Table 1) and in the thorax.

Endoscopic Ultrasonography

There are two types of echoendoscope, defined by the orientation of the ultrasound transducer. The radial echoendoscope uses a rotating, 360° transducer to create a cross-sectional image in a plane perpendicular to the transducer. The image resembles a computed tomographic (CT) scan image. In addition, there are high-frequency, radial "mini-probes," which can be passed through the operating channel of a standard endoscope to provide detailed images of mucosal lesions. The linear echoendoscope scans a narrow 120° viewing plane in the long axis of the endoscope. The linear scanner is able to identify vascular structures using Doppler flow analysis.

Staging. When the gastrointestinal wall is viewed in great detail, it has a five-layer structure (Figure 1). The layers in EUS images correspond to the histological layers of the gut wall. One might expect that detailed imaging of wall layers would provide more accurate staging of gastrointestinal malignancies, and that is the case; EUS is superior to CT for local and regional staging of esophageal, gastric, and rectal cancer (Table 2).

EUS criteria for lymph node invasion by tumor cells include lymph node size, shape, echo-pattern, and demarcation,[1] but CT scanning can evaluate only size. Since cancer survival corresponds to stage of disease, accurate staging with EUS can guide appropriate therapy (for example, surgical resection, with or without neoadjuvant therapy, or palliation only). Still, CT remains invaluable as a staging modality and should be the first study performed after the diagnosis of cancer to look for distant metastases, the presence of which significantly changes management.

Diagnostic EUS. EUS can accurately distinguish intramural masses from external compression of the gastrointestinal tract. Intramural masses (cysts, lipomas and stromal cell tumors) have definitive echo characteristics and arise from characteristic gut wall layers. Foregut duplication cysts appear as echo-free submucosal cysts, whereas lipomas appear as hyperechoic submucosal masses. Duplication cysts are benign, but there is a risk of malignant transformation of lipomas to liposarcoma, and that risk increases as the size of the lipoma increases. Stromal cell tumors such as leiomyomas are hypoechoic and arise from the muscularis propria (Figure 2). Similarly, as size increases, so does the risk for malignant transformation. EUS criteria for malignancy can guide recommendations about surgical resection.[2] In addition, EUS assessment of thickened gastric folds can delineate which wall layer is predominantly thickened. Thickening of the submucosa or muscularis propria suggests an infiltrating malignancy.[3]

Interventional EUS. The advent of the linear array echoendoscope adds interventional and therapeutic applications to the diagnostic uses of EUS. Using ultrasound guid-

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Table 1: Indications for Endoscopic Ultrasound

- Staging of esophageal, gastric and rectal cancer
- Evaluating abnormalities of the gastrointestinal wall or adjacent structures (submucosal masses, extrinsic compression)
- Evaluating thickened gastric folds
- Diagnosis (FNA) and staging of pancreatic cancer
- Evaluating pancreatic abnormalities (suspected masses, cystic lesions including pseudocysts, suspected chronic pancreatitis)
- Staging of cholangiocarcinoma
- Staging of ampullary neoplasms
- Evaluating suspected choledocholithiasis
- Celiac plexus neurolysis for chronic pain due to intra-abdominal malignancy or chronic pancreatitis
- Staging of non-small cell lung cancer (subcarinal and posterior mediastinal lymph nodes)
- Evaluation and diagnosis of posterior mediastinal masses

Table 2: Accuracy in staging of intestinal malignancies

	EUS	CT
Esophageal Cancer[16]		
Tumor staging	76-89%	49-59%
Node staging	72-80%	46-58%
Gastric Cancer[17]		
Tumor staging	92%	42%
Node staging	78%	48%
Rectal Cancer[18]		
Tumor staging	84%	68%
Node staging	84%	60%

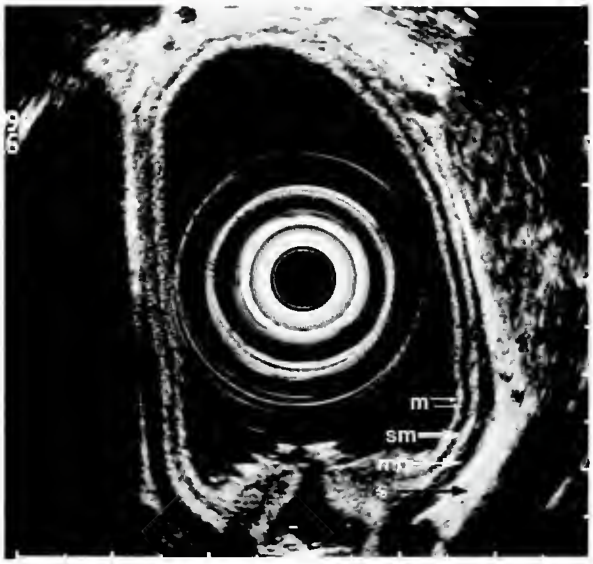

Figure 1: Normal 5 layer structure of the gastric wall. The first 2 layers comprise the mucosa. m = mucosa, sm = submucosa, mp = muscularis propria, s = serosa/adventitia.

ance, 22-gauge needles can be passed into intramural or extrinsic masses to obtain cells for cytological analysis. Color Doppler analysis allows the operator to avoid blood vessels during fine needle aspiration (FNA), and thereby decrease the risk of bleeding complications. The overall diagnostic yield for EUS-guided FNA is 77%. Complications have been associated with this technique in less than 1% of cases.[4] EUS-guided FNA has become increasingly important in the tissue diagnosis of pancreatic cancer (Figure 3). The sensitivity of EUS-guided FNA in diagnosing pancreatic cancer has been calculated at 75%-88%.[5] Neoplasms of the Ampulla of Vater can be diagnosed and staged by EUS.

Pancreatic EUS-guided FNA offers several potential advantages over percutaneous, CT-guided biopsies. The advantages of EUS-FNA include shorter needle tracks (with less chance of peritoneal seeding), use of smaller diameter needles, use of Doppler analysis to avoid blood vessels, and better access to smaller lesions.[4] Additionally, pancreatic cancer can be staged at the time of tissue diagnosis, using EUS-guided FNA. Overall, both techniques are remarkably good. New, advanced, dual-phase helical CT scanners can stage tumor and nodal disease with an accuracy of 86% and 77%, respectively; EUS is slightly more accurate at 90% and 86%, respectively.[6] A prospective, randomized trial of percutaneous, CT-FNA versus EUS-FNA in the diagnosis of pancreatic masses is currently under way at Duke University Medical Center.

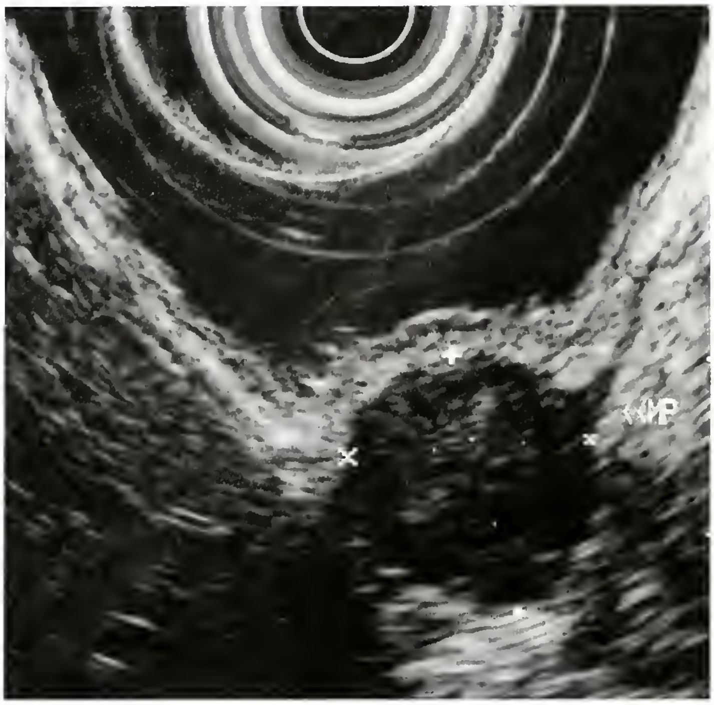

Figure 2: A 15 x 14 mm round, well demarcated hypoechoic mass arising from the muscularis propria (MP). This finding is most consistent with a stromal cell tumor (leiomyoma).

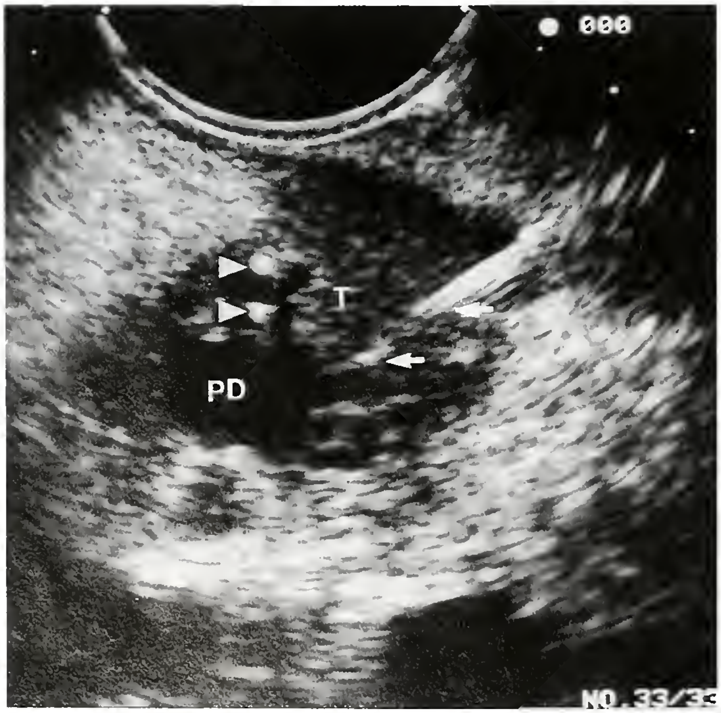

Figure 3: A small 2 cm hypoechoic tumor (T) in the head of the pancreas. A biliary stent (arrow heads) is in the common bile duct, above a dilated pancreatic duct (PD). Fine needle aspiration revealed pancreatic adenocarcinoma (arrows = needle tip).

EUS is helpful in many other pancreatico-biliary disorders. It can locate and diagnose (via FNA) small neuroendocrine tumors of the pancreas, including gastrinomas.[7] It can characterize pancreatic cystic lesions using FNA to obtain cyst fluid for cytological study and identification of tumor markers associated with cystic neoplasms. Cyst infection is a risk of such procedures, and so use of prophylactic antibiotics is warranted. EUS can guide endoscopic drainage of pancreatic pseudocysts. The gastric wall can be surveyed and marked for cyst gastrostomy, and EUS guidance may lower the risk of transgastric stent placement because vessels can be avoided.[8] Correlation of defined EUS criteria with excised pathological specimens also allows EUS to identify the stigmata of chronic pancreatitis in patients with the appropriate clinical scenario.[9]

EUS is an excellent way to visualize the biliary tract because of its proximity to the duodenal bulb. EUS can detect common bile duct stones (choledocholithiasis) better than CT or trans-abdominal US, particularly in patients with small stones and normal-caliber bile ducts.[10] Given that endoscopic retrograde cholangiopancreatography (ERCP) runs the risk of inducing pancreatitis, EUS may be especially appropriate for evaluating patients in whom there is a low suspicion for choledocholithiasis; ERCP remains the test of choice in patients who are highly likely to have duct stones because ERCP offers the possibility of removing the stone. Suspicious findings such as strictures, dilated ducts and gland enlargement can be evaluated with EUS, and pancreatic or bile duct masses can be visualized and sampled at one procedure via EUS-guided FNA.

Control of Intractable Abdominal Pain. The pain of pancreatic cancer can be intolerable and difficult to control. Celiac plexus neurolysis is a therapeutic application given the ability of EUS to visualize the takeoff of the celiac trunk from the aorta. This allowa anesthetic or neurolytic agents to be injected directly into the celiac ganglion with minimal morbidity (Figure 4). Temporary blocks with anesthetics have not controlled chronic pancreatitis pain well, but alcohol ablation shows promise for improving pain due to pancreatic cancer.[11,12]

Endoscopic Ultrasonography in the Thorax

EUS and FNA are very useful in the staging of nonsmall-cell lung cancer. EUS can visualize the posterior mediastinum, allowing enlarged lymph nodes to be sampled easily. CT is 49-74% accurate in detecting malignant mediastinal lymph nodes, whereas EUS-guided FNA accuracy ranges from 96-100%.[13,14] EUS can preferentially access the aortopulmonary window and subcarinal space, two of the more difficult stations to reach via mediastinoscopy. EUS-guided FNA is "especially helpful in the preoperative evaluation of patients with suspicious contralateral mediastinal or bulky subcarinal lymph nodes"[13] (Figure 5). Some centers now consider EUS-guided FNA the technique of choice for sampling the subcarinal space and AP window. The left adrenal gland can also be evaluated when staging lung cancer; adrenal metastases can be diagnosed via EUS-guided FNA (Figure 6).[15]

Mediastinal masses are amenable to EUS-guided FNA. The accuracy rate for a cytologic diagnosis is 83-89%.[4] It is an outpatient procedure, takes 20 to 30 minutes, and requires only conscious sedation. It is a cost-effective and minimally invasive way to make a diagnosis.

Potential Problems

Endoscopic ultrasound has its limitations. Malignancies may be understaged because of microscopic invasion, or overstaged because of tumor-induced inflammation. EUS and EUS-guided FNA are technically challenging procedures, which means that they are dependent on operator skill and experience. Advanced training in EUS is a requirement for proficiency in performing the procedure. The equipment is quite costly, therefore, EUS tends to be performed in academic medical centers. Nevertheless, it is likely that the clinical indications for and applications of EUS will continue to expand. ❒

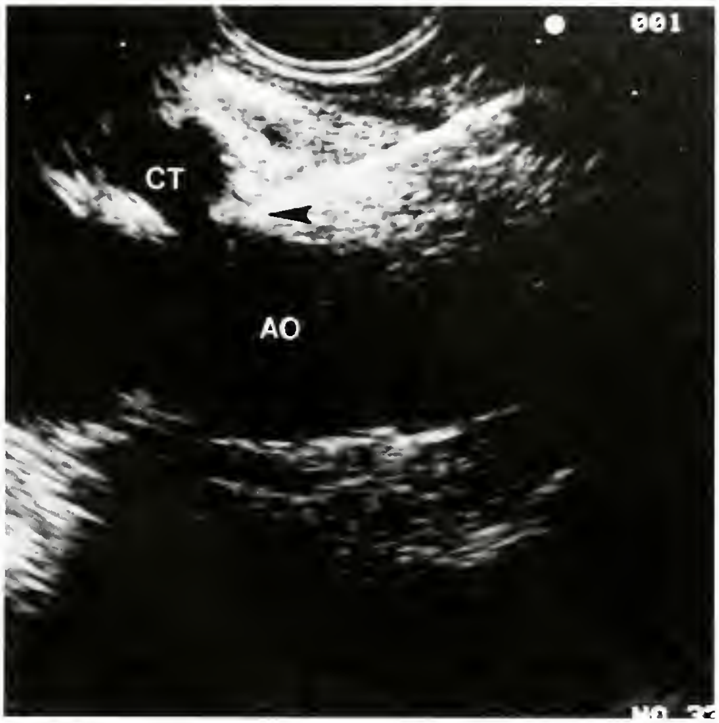

Figure 4: Celiac plexus neurolysis in a patient with intractable pain from pancreatic cancer. The needle tip (black arrow head) is seen at the takeoff of the celiac trunk (CT) from the aorta (AO).

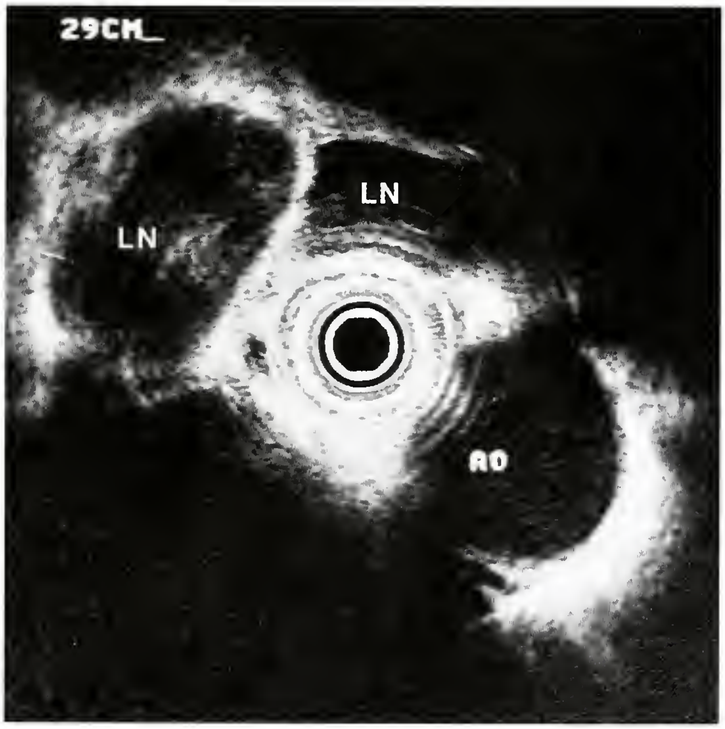

Figure 5: Two bulky subcarinal lymph nodes (LN) in a patient with non-small cell lung cancer. (AO = aorta).

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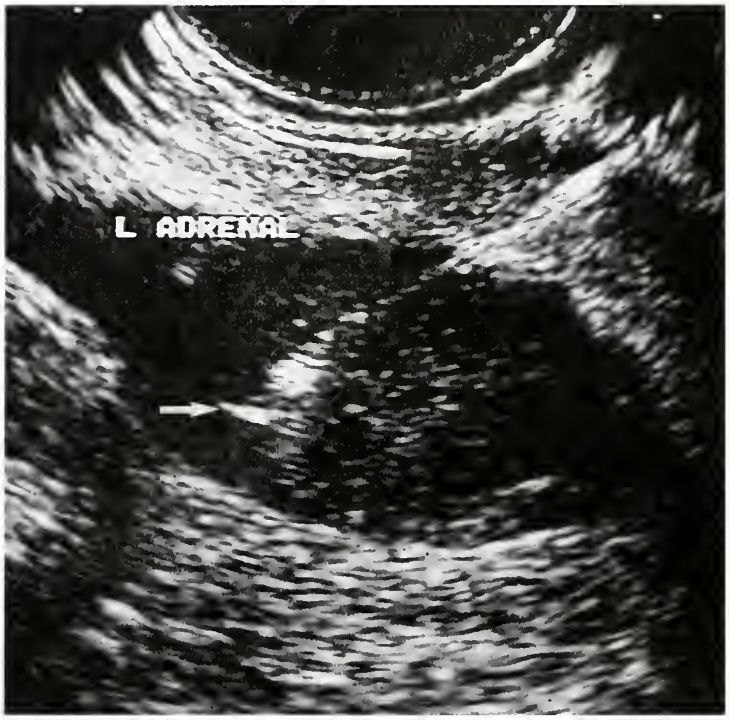

Figure 6A: Fine needle aspiration of a suspicious left adrenal gland (arrow = needle tip) in a patient with Stage I non-small cell lung cancer. Cytology was positive, upstaging the patient to Stage IV disease.

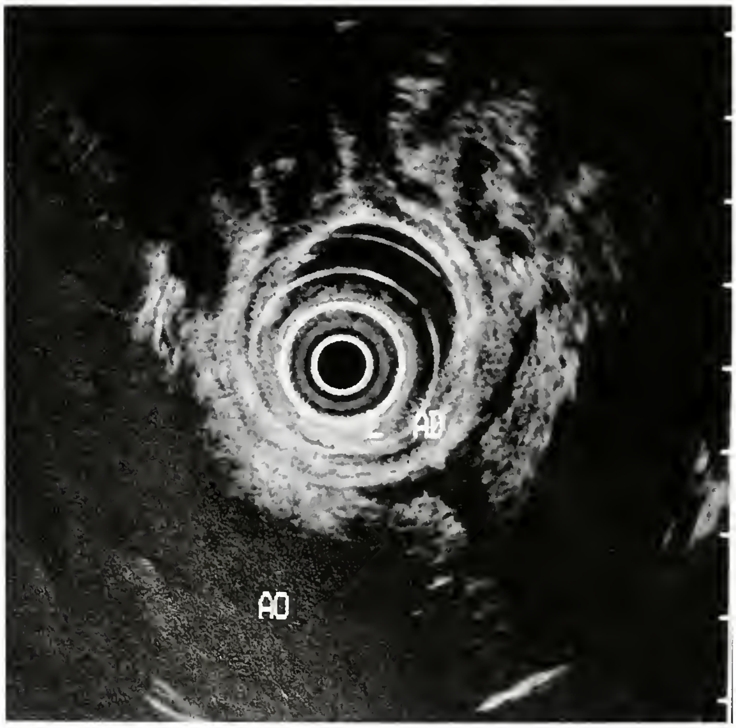

Figure 6B: A normal appearing left adrenal gland (L AD). AO = aorta.

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A Woman with Low Energy and High Calcium

Susan Spratt, MD

The Patient

A successful businesswoman—and partner in a major North Carolina consulting firm—often worked 60 hours/week, traveling intercontinentally and raising a family of three children. But, at the age of 47, she found herself physically and emotionally exhausted. She was surprised by her increasing fatigue and emotional lability because previously, she said, "it had taken a lot to rattle me." She saw a doctor who told her everything "checked out," and several months later a second physician suggested trying an antidepressant. Before filling the prescription, she decided she needed a life change. She enrolled in Duke University's Rice Diet Program where routine blood tests revealed a markedly elevated calcium of 14.7 mg/dL (normal, 8.7-10.2).

She was sent to the Emergency Room where her history was vague and difficult to elicit and she seemed mentally "dull," given her record of work accomplishments. There was a barely palpable mass low in the left anterior neck, just above the clavicle. In the ER, her calcium had risen to 15.7, serum phosphorus concentration was 1.9 mg/dL (normal, 2.3-4.3), and serum concentration of intact parathyroid hormone was 571 pg/mL (normal, 12-72). She was admitted for aggressive intravenous hydration and diuresis with furosemide. A radioactive sestamibi scan was compatible with a single adenoma in the inferior left parathyroid gland (see Figure).

Although patients with hypercalcemia may have symptoms, often the practitioner stumbles on an elevated calcium during laboratory screening of an asymptomatic patient. Indeed, review of our patient's health history revealed that she had undergone such testing 10 months earlier, at which time her calcium was 12.8 mg/dL (lab normal, 8.5-10.6) and phosphorus 2.5 mg/dL (lab normal, 2.5-4.5). Nothing was done then, in part because she offered no complaints and in part because the abnormal screening test result, being unanticipated, was not acted upon.

This paper will review the evaluation and management of hypercalcemia and primary hyperparathyroidism, the most common cause of hypercalcemia in the outpatient setting.

Pathophysiology of Hypercalcemia

About 50% of serum calcium circulates ionized and unbound, 10% is complexed with serum citrate and phosphate, and 40 % is bound to serum proteins.[1] Under normal conditions, parathyroid hormone (PTH) maintains serum calcium concentration within narrow limits by regulating intestinal and renal absorption of calcium and mobilization from the skeleton (where 99% of total body calcium is stored). PTH secretion is stimulated by low serum concentrations of calcium and inhibited by high concentrations. Within minutes of its release, PTH increases reabsorption of calcium by the kidney, promotes renal wasting of phosphate, and increases resorption of bone by stimulating osteoclast activity. PTH activates Vitamin D, thereby increasing gut absorption of calcium.

Blood calcium levels exceed normal when increased bone resorption or increased gut absorption of calcium exceeds the ability of the kidneys to excrete or bone to absorb the excess.[2] The etiology of hypercalcemia is therefore linked to one of four mechanisms: (1) increased bone resorption; (2) excess intestinal absorption, usually vitamin D-related; (3) impaired renal excretion, including renal failure; or (4) excess PTH secretion, which simultaneously activates mechanisms 1-3.

In 80% of cases, primary hyperparathyroidism is caused by a solitary, benign adenoma.[3,4] A clone of parathyroid gland chief cells expands and loses its ability to sense calcium, causing inappropriate secretion of PTH.[3] The remaining

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parathyroid tissue is normal and its PTH secretion is suppressed. In 15 to 20% of cases, all four glands become hyperplastic and the increased number of cells leads to oversecretion of PTH. Because parathyroid gland hyperplasia is associated with multiple endocrine neoplasms (especially adenomas of pituitary, pancreatic islets, and adrenal glands), it is important to screen patients with hyperplasia and their family members for associated diseases. Parathyroid carcinoma is the cause of hypercalcemia in less than 1% of cases.[3,4]

Symptomatology of Hypercalcemia

In the past, primary hyperparathyroidism was considered rare because it was only discovered after severe bone disease (osteitis fibrosa cystica) had occurred,[3,4] but routine screening picks up a case of primary hyperparathyroidism about once in every 500-1000 outpatients. Women are affected three times more often than men.[3]

Elevated serum calcium affects nearly every organ system because calcium plays a major role in cell signaling, myocyte contraction, and neurotransmitter release. There are many symptoms and signs of hypercalcemia (Tables 1 and 2), but the main neurological symptoms are fatigue and depression, as in our patient's case. Even when patients are themselves unaware of changes in mental function, family members may remark on subtle loss of mental concentration.[2,4,5]

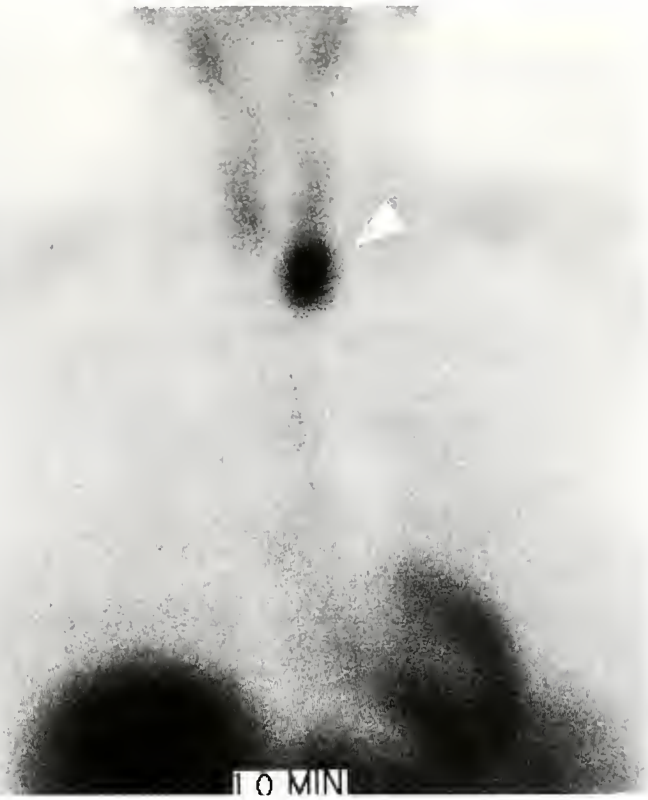

Figure. Sestamibi—also known as Cardiolyte—is absorbed by the liver, heart, and parathyroid glands. The figure shows clear outlines of liver and heart as well as a large left lower parathyroid adenoma [arrow]. Smaller amounts of tracer are visible in the salivary glands and as a diffuse background radioactivity.

Since blood calcium is excreted by the kidney, elevated blood levels increase the risk of stones. Furthermore, calcium can directly damage the kidney tubules, impairing their

Table 1. Symptoms of Hypercalcemia

- Fatigue
- Depression
- Mental confusion
- Anorexia
- Nausea
- Vomiting
- Constipation
- Muscle weakness
- Flank pain indicating nephrolithiasis
- Polyuria

Table 2. Signs of hypercalcemia

- Shortened QT interval
- Acute and chronic renal insufficiency (nephro calcinosis)
- Band keratopathy
- Bowel hypomotility
- Increased gastrin secretion
- Pancreatitis
- Nephrogenic diabetes insipidus
- Dehydration
- Coma
- Hypertension
- Nephrolithiasis

Table 3. Etiology of hypercalcemia[7,9]

- Parathyroid related
    - Primary hyperparathyroidism
        - Single adenoma
        - Multiple endocrine neoplasia
        - Parathyroid hyperplasia
    - Tertiary hyperparathyroidism
    - Familial hypocalciuric hypercalcemia
    - Lithium therapy
    - Malignancy rRelated
    - Bone metastases (increased bone resorption via cytokines)
    - Humoral osteoclast activators
        - PTH-related protein
- Vitamin D related
    - Vitamin D intoxication
    - Increased production of 1, 25 OH vitamin D by Hodgkins lymphoma
    - Sarcoidosis
- Associated with renal failure
    - Severe secondary hyperparathyroidism
    - Milk alkali syndrome
- Causes of hypercalcemia due to increased bone resorption
    - Immobilization
    - Paget's disease
    - Hypervitaminosis A
- Other causes of hypercalcemia
    - Hyperthyroidism
    - Pheochromocytoma
    - Adrenal insufficiency
    - Rhadomyolysis
    - Theophylline toxicity
    - Thiazide diurectics

ability to concentrate urine (a condition known as nephrogenic diabetes insipidus). The resulting polyuria can cause dehydration, worsening the hypercalcemia. Over the long term, deposition of calcium in the kidney (nephrocalcinosis) can cause permanent renal insufficiency.[2,5] Hypercalcemia decreases gut motility, leading to constipation, nausea, and vomiting. Vomiting can lead to dehydration and worsen the hypercalcemia.[2,5]

The electrocardiograpic Q-T interval is shortened by high blood calcium levels, indicating a faster rate of repolarization. Slowed depolarization may give rise to bradyarrythmias. Ventricular hypertrophy has been described, but this may be due to hypertension.[2]

Rarely seen manifestations of hypercalcemia include band keratopathy (calcium deposits in the medial and lateral margins of the cornea) and arthritis (gout and pseudogout). Osteitis fibrosa cystica was first described in 1891, but its relation to parathyroid hyperfunction was only discovered in 1925. Hyperparathyroidism produces generalized demineralization of bone, subperiosteal resorption (particularly of the phalanges), bone cysts, and a ground-glass, mottled radiographic appearance of the skull. In addition, classic primary hyperparathyroidism has been associated with severe nephrolithiasis and nephrocalcinosis, type 1 muscle fiber myopathy, peptic ulcer disease, hypertension, gout, pseudogout, band keratopathy, and anemia[3,4] – the classic "bones, stones, groans and moans" of hyperparathyroidism.

Not only is primary hyperparathyroidism far more common than previously thought, the "modern" disease has a clinical presentation very different from that originally described. Osteitis fibrosa cystica is now rare, but patients with renal disease run the risk of bone disease from secondary and tertiary hyperparathyroidism (renal osteodystrophy). Kidney stones and hypercalciuria are still a predominant manifestation of primary hyperparathyroidism, but the incidence of nephrolithiasis has dropped from 33% to 20%.[3,6]

The most common neurologic symptoms of modern primary hyperparathyroidism are vague and subtle complaints of disturbed mental concentration, fatigue, and memory rather than objective signs of muscle weakness.

Several common medical conditions, once thought to be caused by hyperparathyroidism, may represent only spurious associations. For instance, peptic ulcer is now thought not to be more common in hyperparathyroidism except when it is part of a multiple endocrine neoplasia syndrome with an associated gastrin-producing tumor. Similarly, high blood pressure can be found in patients with primary hyperparathyroidism, but surgical cure of the hypercalcemia usually does not normalize blood pressure. Other once-associated conditions (anemia, gout, pseudogout, band keratopathy) are rarely seen.

Diagnosis

The causes of hypercalcemia are many (Table 3). In about 90% of outpatients the culprit is primary hyperparathyroidism,[7] and in 50% of inpatients it is a malignant process. Malignant causes are usually not subtle; if the patient does not have a known or readily apparent cancer, it is unlikely that malignancy is the cause of hypercalcemia. In other words, it is rare for hypercalcemia to be the first sign of a malignancy. The simultaneous ingestion of milk and acid-neutralizing substances can raise serum calcium levels. Peptic ulcer is no longer treated with milk diets and sodium bicarbonate, but the incidence of milk-alkali syndrome is rising because calcium carbonate, with or without vitamin D, is used to prevent and treat renal osteodystrophy, osteoporosis, and gastroesophageal reflux.[7]

Table 4. NIH Consensus Statement on Indications for Surgery in Primary Hyperparathyroidism[10]

- Symptoms of hypercalcemia as defined by:
  - Documented nephrolithiasis (radiographic or by history)
  - Hyperparathyroid neuromuscular disease
  - Other symptoms attributable to hypercalcemia (fatigue, constipation, etc)
  - Life-threatening hypercalcemia
  - Laboratory indications
    - Serum calcium >12mg/dl (3mmol/L)
    - Reduced creatinine clearance
    - Radiographic evidence of hyperparathyroid bone disease
    - Urinary calcium excretion greater than 400 mg/day off calcium supplementation
    - Bone mineral density >2SD below sex- and age- matched controls
- Age less than 50
- Uncertain medical follow-up or unwillingness of patient to live with disease

The Value of the History. The clinical history provides important clues as to the etiology of hypercalcemia. A family history of hyperparathyroidism or multiple endocrine neoplasia suggests primary hyperparathyroidism, as does a history of neck radiation, a long period of asymptomatic hypercalcemia, and otherwise good health.[8] A careful diet and medication history can identify vitamin D intoxication or other medication-induced causes of hypercalcemia (such as theophylline, thiazide diuretics, lithium, thyroid hormone). Unless the history and physical exam suggest a rare cause of hypercalcemia, no exhaustive search should be done initially.[8]

Laboratory Evaluation. Falsely elevated calcium levels should be excluded. High serum levels of total (but normal concentrations of ionized) calcium may be found in hyperproteinemia including that induced by hemoconcentration or prolonged application of a tourniquet during the drawing of blood samples.[9] Once an artifactual hypercalcemia has been excluded, the next step is to measure the blood levels of intact PTH. High levels indicate hyperparathyroidism (as do "normal" levels in the presence of an elevated calcium, when PTH should be suppressed). The PTH level is high in renal insufficiency, making the diagnosis of primary hyperparathyroidism difficult. If PTH is low or low-normal, levels of PTH-related protein (PTH-RP), 25-OH and 1,25-$(OH)_2$ vitamin D (calcidiol and calcitriol) should be measured. High levels of vitamin D with no history of vitamin D ingestion, should lead to a search for granulomatous disease or lymphoma.

> "Patients who have mild to moderate hypercalcemia (calcium <12mg/dL) should be evaluated for the metabolic consequences of primary hyperparathyroidism."

The serum phosphate level can help in diagnosis. It is low in primary hyperparathyroidism and malignancy-associated hypercalcemia caused by the secretion of PTH-RP. Phosphate concentrations are high or normal in hypercalcemia due to most other causes, including secondary hyperparathyroidism in renal failure.[9]

Determination of calcium excretion in a 24-hour urine specimen can help differentiate familial hypocalciuric hypercalcemia, thiazide diurectic-induced hypercalcemia, and the milk-alkali syndrome (in which cases 24-hour excretion is less than 100mg) from primary hyperparathyroidism (where it is high-normal or high) and from hypercalcemia of malignancy (where 24-hour excretion is distinctly high).[9]

Treatment

Patients with severe hypercalcemia (serum calcium of 13-14 mg/dL or higher) need immediate and aggressive hydration with intravenous saline solution followed by diuresis with a loop diurectic such as furosemide after hydration has been accomplished. Medical treatment of primary hyperparthyroidism should be considered only temporizing. Patients who are not surgical candidates because of concurrent illness or short life expectancy can be treated with bisphophonates, although this may take up to three days to be effective. Calcitonin, glucocorticoids, and hemodialysis can be helpful while waiting for bisphosphonates to work or for stabilizing the patient prior to surgery.

Surgery can cure hyperparathyroidism. Operation is indicated in patients with severe consequences of hyperparathyroidism such as recurrent kidney stones, hyperparathyroid bone disease, and, as in our patient, severe hypercalcemia (Table 4).[10] However, because so many mild cases of hyperparthyroidism are discovered on testing of asymptomatic patients, the consensus statement also lists laboratory indications for operation.

Patients who have mild to moderate hypercalcemia (calcium <12mg/dL) should be evaluated for the metabolic consequences of primary hyperparathyroidism. The search should include measurement of 24-hour excretion of calcium since excretion of over 400mg/day is in itself an indication for parathyroid surgery. In addition, patients need radiographic search for kidney stones or nephrocalcinosis, and bone mineral density measurement. Dual photon X-ray absorptiometry (DXA) has replaced plain radiographs of the hands in the detection of PTH-induced bone disease because subperiosteal resorption of the phalanges is rare.[6]

A careful history is essential to ascertaining whether patients are symptomatic or not. Nowadays, only 20% of patients with primary hyperparathyroidism are symptomatic, but half meet one or more of the NIH criteria for surgery.[10] Some physicians have added two other indications for surgery: 1) a very low vertebral bone mass (since low bone mineral density may increase after surgery); and 2) concomitant vitamin D deficiency (since replacement of vitamin D can worsen hypercalcemia).[6] The presence of hypertension or peptic ulcer disease is not an indication for surgery.

Young, asymptomatic patients may want to attempt surgical cure for several reasons. It can be disconcerting to live with—and regularly monitor—a chronic disease that might be truly cured. The very long-term effects of mild hyperparathyroidsm are largely unknown, but a recent prospective study found that 27% of initially asymptomatic patients progressed to meet criteria for surgery over a ten-year period.[11] Those who did not require surgery had no decrease in bone mineral density unless they had another risk factor for osteoporosis, such as menopause.

> "Primary hyperparathyroidism is often asymptomatic, but subtle neurological changes can easily be missed. Physicians should be attuned to these. Secondly, patients who present with new psychiatric symptoms deserve metabolic and neurological evaluation before diagnosis of a psychiatric illness."

It may be difficult to decide about the relationship between vague symptoms and borderline hypercalcemia. In those cases it may help to treat the patient medically to see whether the symptoms improve. While it may be difficult to decide whether and when to go to surgery for mild hypercalcemia, there is no controversy about the value of choosing an experienced parathyroid surgeon. Novice surgeons may find it hard to distinguish single adenomas from four gland hyperplasia. Furthermore, in the hands of experienced surgeons, parathyroid surgery leads to few of the potential complications such as recurrent laryngeal nerve injury, wound infection, wound hematoma, and hypocalcemia. "Hungry bone" syndrome (severe, transient hypocalcemia) is rare and only occurs when there is significant bone disease.

Abnormal parathyroid glands can be localized using sestamibi radioisotope imaging, ultrasound, and magnetic resonance and computed tomographic scans. The sestamibi scan is the technique of choice and is often used before any surgery because of its sensitivity and high specificity. The other modalities are only used if there has been prior (unrelated) neck surgery or if a first operation has failed to locate a parathyroid adenoma.[3]

It is acceptable to follow asymptomatic patients with mild hypercalcemia (serum calcium <11.5mg/dL) or elderly patients and those with multiple comorbid diseases. Such patients should avoid dehydration, immobilization, calcium-supplemented foods (orange juice, milk), thiazide diuretics, and lithium therapy.[3] Severely restriction of calcium in the diet is not wise, because this may increase secretion of PTH. Patients should be aware of the symptoms of hypercalcemia and seek immediate advice if symptoms appear. Blood calcium levels and other consequences of hyperparathyroidism should be assessed once to twice a year. Bone mineral density and 24-hour urinary excretion of calcium and should be measured annually. Appropriate radiographs are indicated when there are symptoms suggesting kidney stone.

The Patient Revisited

The patient was hospitalized on discovery of severe hypercalcemia; after two days of intravenous saline and furosemide diuresis, her serum calcium had fallen from over 15 to 11.3 mg/dL. A sestamibi scan was clearly positive, and on the third hospital day a 1.596 gm left parathyroid adenoma was removed (normal parathyroid glands weigh less than 60 mg). Intraoperative measurement of serum PTH showed a fall from 237 to 27 after resection, indicative of successful cure.

Following her surgery, all measurements of serum calcium and phosphorus have been normal (most recently, 9.0 and 3.4 mg/dL, respectively). Eighteen months after surgery she describes herself as "calm, cool, and rational." She is no longer short-tempered and is once more able to cope with the everyday stress of managing her business and her life.

Our patient's case teaches us several lessons. Primary hyperparathyroidism is often asymptomatic, but subtle neurological changes can easily be missed. Physicians should be attuned to these. Secondly, patients who present with new psychiatric symptoms deserve metabolic and neurological evaluation before diagnosis of a psychiatric illness. At the minimum, this evaluation should include measurement of serum calcium and thyroid hormone levels, renal function, and a complete blood count. Thirdly, all patients with mildly elevated calcium (<12mg/dl) should have a work up to confirm the diagnosis of hyperparathyroidism and to decide whether they are truly asymptomatic. If surgery is not recommended, patients should be followed systematically, and should learn the symptoms for which they will need to seek prompt medical advice. ❑

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Project IDEAL

A Plan to Reduce the Burden of Diabetes in North Carolina

Vanessa T. Duren-Winfield, BS, Ronny A. Bell, PhD, MS, Roger T. Anderson, PhD, John H. Frank, MBA, Joseph C. Konen, MD, MSPH, David C. Goff, Jr, MD, PhD

Diabetes places a tremendous burden on the citizens of North Carolina, particularly on minorities, the elderly, and the poor.[1] In 1997, about 300,000 North Carolinians carried the diagnosis of diabetes. Costs of their hospital-based care exceeded $1.4 billion for over 123,000 hospital admissions covering 780,000 hospital days. A major risk factor for cardiovascular disease, kidney failure, lower extremity amputation, and blindness,[2] diabetes greatly diminishes functional status and quality of life. Every year, it causes over 1,800 deaths in NC and contributes to another 5,100 deaths.[3]

Effective management of diabetes can reduce or delay its associated complications.[4] However, this requires a tremendous effort from both patients and caregivers, and many barriers exist to the delivery of effective care to underserved persons with diabetes. The challenge facing North Carolina is to recognize and reduce these barriers. A unique initiative now under way, sponsored by the Kate B. Reynolds Charitable Trust, aims to reduce the burden of diabetes in this state by enhancing awareness of the disease and its complications. The program will improve the quality of life and quality of care for North Carolinians with diabetes.

The Kate B. Reynolds Charitable Trust

In 1947, a trust was created under the will of Kate Gertrude Bitting Reynolds, widow of William Neal Reynolds, one-time Chairman of R. J. Reynolds Tobacco Company. One-fourth of the income from the Trust is designated to improve the welfare of the poor and needy in Winston-Salem and Forsyth County, and three-fourths goes to increase the availability of health care to underserved North Carolinians and to support other meritorious programs related to this goal. This health care division of the Trust gives emphasis to rural areas. It encourages health promotion and illness prevention, including early detection and intervention, and it supports well-conceived studies to define health care problems in North Carolina and develop viable solutions to them. The Trust has provided startup money to launch a number of programs that later were adopted and continued by local and state government units.

The Project IDEAL Initiative

After reviewing data on the burden of diabetes in North Carolina, and after extensive consultation with the North Carolina Diabetes Advisory Council and the North Carolina Diabetes Prevention and Control Unit, the Trust made one of the largest single grants in its history toward the goal of reducing that burden statewide. In May 1999, the Kate B. Reynolds Charitable Trust committed $2.5 million over two years to fund 14 programs under the rubric of Project IDEAL (Improving **D**iabetes **E**ducation, **A**ccess to care and **L**iving). It will fund public and private, non-profit healthcare organizations that serve populations with a substantial burden of diabetes, have a record of collaboration with community organizations, and have demonstrated sustainability and local commitment.

The Trust contracted with the Department of Public Health Sciences at Wake Forest University School of Medicine to coordinate the initiative's objectives: (1) to improve the quality of life and quality of care of underserved North

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Carolinians with, or at risk for, diabetes mellitus; (2) to promote local and regional collaboration among physicians, non-traditional health care providers, allied health professionals and public health agencies and other community organizations serving this population; and (3) to encourage integrated, coordinated care. An advisory committee chaired by Dr. Joseph C. Konen and with members from the North Carolina Diabetes Advisory Council, the North Carolina Diabetes Control Program, Medical Review of North Carolina, the Area Heath Education Centers Program, the state Primary Health Care Association, the Office of Rural Health, Carolinas Medical Center, the University of North Carolina at Chapel Hill, the Division of Diabetes Translation of the Centers For Disease Control and Prevention, and other state public health agencies assists in the development of the Requests for Application, participates in the review process and technical assistance workshops, provides continuing education to grantees, and facilitates dissemination of successful projects to other areas of the State.

Description of Project IDEAL Programs. Project IDEAL reviewed 55 responses to its request for applications; 27 organizations were invited to submit full applications and to attend a technical assistance workshop. Fourteen organizations were approved to conduct diabetes control projects spanning a two-year period beginning on July 1, 1999. The Table gives descriptive summaries of the funded projects.

Initiative Evaluation. The Trust will centrally evaluate the Initiative under the direction of the Wake Forest University School of Medicine. A sample of approximately 50 persons, drawn from each participating site, will be surveyed at baseline and in follow-up to detect any change from baseline and to assess outcome measures. Data will be collected about the processes of care, the degree of control of diabetes, and other important factors related to diabetic complications. Additional identifying information (name, address and phone number) will be collected in order to conduct a telephone survey regarding satisfaction with care and health-related quality of life.

Medical Review of North Carolina will perform chart abstractions to determine the quality of care provided to patients with diabetes among clinics funded for Project IDEAL. Their trained staff will gather data on quality indicators, demographics, insurance type, medical history, physical exam, laboratory testing, patient education, and treatment.

Health-on-Call, an affiliate of Wake Forest University School of Medicine, will conduct a 20-25 minute telephone survey of patients to assess their satisfaction with their current diabetes care and their perceived quality of life as persons with diabetes mellitus, and will ask them to rate the quality of their care. The results of the baseline evaluation will be shared individually with the grantees for use in program development.

Conclusions

As the new millennium approaches, the goal of Project IDEAL is to create environments and services that will improve the quality of life and health care of underserved North Carolinians with—or at risk for—diabetes mellitus and its complications. The *Patterns of Care: Guidelines for Diabetes Care* handbook sets uniform guidelines to insure proper care of diabetics and—primarily—to enhance their quality of life. We can succeed only if patients, families, and health care providers work together to improve blood glucose control and all other components of optimal diabetes care.

The results of Project IDEAL will be disseminated widely, in hopes that its programs will serve as models for further efforts to improve the quality of care of patients with diabetes and other chronic health problems. We anticipate that this initiative will give grantees the capacity to mount similar quality-improvement efforts, and we hope that this effective collaboration by the organizing members of the Advisory Committee will increase their ability—and likelihood—to organize future collaborative efforts devoted to the health of underserved populations.

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Table. Funded Project Components of the IDEAL Diabetes Initiative

Onslow County Health Department

The Diabetes Health Watch of the Onslow County Health Department is implementing a community-based diabetes screening program, a pharmacy visitation program, and diabetes education classes. The program will measure glycosylated hemoglobin and provide glucose monitoring for persons with diabetes.

Catawba County Center for Diabetes Control

A rural diabetes team based in Hickory will provide diabetes screening and patient education, focusing primarily on remote sites. Self-care skills and free foot and eye exams will also be performed.

Columbus County Health Carolinians

This program will expand an existing diabetes education program, address how lack of transportation impairs the quality of diabetes care, and develop a standards-of-diabetes-care flow sheet. In addition, the program will establish and maintain diabetes support groups within the county.

Wake Health Services, Inc

The Awareness and Community Education of Diabetes Project will model community-specific comprehensive diabetes education and early disease identification through clinic-based counseling, referral, community outreach, and quality improvement initiatives. The project will increase health services to the uninsured or underinsured in Wake County, and will provide risk assessment screening, education, and follow-up to patients with diabetes. The project will also develop a quality of care improvement protocol for health care providers.

Cabarrus Memorial Hospital/NorthEast Medical Center

The Community Diabetes Identification & Management Initiative will form a partnership with the Cabarrus Health Alliance, the Logan Family Center, and the Free Clinic Program that will allow the initiative to reach a predominantly low-income, ethnic minority population. A diabetes case management program will emphasize diabetes self-management.

Gaston Family Health Services, Inc

The Gaston Diabetes Center will target diabetes education to approximately 1,500 low-income Gaston County residents and will also provide referrals to diabetes support groups and identify strategies to minimize transportation barriers in the area.

Bladen County Hospital

The Bladen Health Watch will create "Health Depots" in rural communities of Bladen County to provide screening, health assessment, health education, dietary counseling, and medication assistance for persons who have difficulty accessing the medical system.

FirstHealth of the Carolinas, Inc

The FirstHealth Diabetes Initiative will extend existing diabetes services into a four-county region surrounding Moore County. The program will use local health care providers, diabetes educators, and lay advisors for screening, diagnosis, and education for persons with diabetes, and to increase the effort to detect undiagnosed diabetes.

North Carolina Foundation for Advanced Health Programs, Inc

This program will develop the Rural North Carolina Diabetes Initiative, a partnership of two rural health care systems in Wayne and Pender Counties, that will promote appropriate screening, monitoring, and patient and staff education. The initiative will also provide diabetes case management.

Perquimans, Pasquotank, Camden, and Currituck District Health Department

The Albermarle Regional Diabetes Care Program will expand a multi-disciplinary approach to diabetes care into three additional counties (Gates, Dare, Hertford). The program will increase public awareness about the impact of diabetes and the need for screening and appropriate care in rural eastern North Carolina.

Free Clinic of Reidsville

The Clinical Monitoring Program will collaborate with the Greensboro Area Health Education Center to reduce the burden of diabetes among low-income persons in Rockingham County. It will provide early diabetes identification and enhanced patient care and education, using clinical pharmacy students as patient educators and quality assurance coordinators.

Duke University: The Durham County Community Diabetes Management Project

This project will provide diabetes case management to four low-income areas in Durham County, try to increase diabetes awareness through community-based screening, and link newly diagnosed patients with local health care providers.

Better Health of Cumberland County, Inc

The Taking Charge of Diabetes Project will expand current efforts to provide appropriate care to low-income persons in Cumberland County, providing community screenings and referrals and a formalized diabetes education and self-management program.

Edgecombe County Health Department

The Diabetes Control Project is a collaboration between the Edgecombe County Health Department, Heritage Hospital, and the Edgecombe Community College. The Project will provide individualized and group diabetes education to persons with diabetes in Edgecombe County.

Carolina Physician's Roundtable

Edward C. Halperin, MD, Section Editor

Whatever Happened to Psychotherapy?

Whatever happened to psychotherapy? Fewer and fewer patients appear to be receiving long term psychotherapy and insurance companies rarely seem to pay for it. It no longer seems to be the butt of comedians' jokes (sometimes the measure of the penetration of forms of medical practice into societal consciousness). The North Carolina Medical Journal *asked a few psychiatrists to discuss the future of psychotherapy. If it is indicated, for which patients? What will become of psychoanalytic training and the psychoanalytic tradition? Our two discussants on this issue are Harold Kudler, MD, from the Department of Psychology and Behavioral Sciences at Duke University, and Assad Meymandi, MD, PhD, LFAPA, a psychiatrist practicing in Raleigh.*

As always we invite the readers of the North Carolina Medical Journal *to participate in the discussion via the* Letters to the Editor *section.* — ECH

Dr. Kudler:

While I have not been clocking the *New Yorker's* cartoons, I can testify that psychotherapy is alive and well in North Carolina. A quick perusal of the *Yellow Pages* for Raleigh, Durham, and Chapel Hill documents the number and variety of therapists available. Psychotherapy, which once connoted psychoanalytically based (psychodynamic) treatment, has blossomed into a panoply of techniques—cognitive, behavioral, biofeedback and hypnotherapies—which are practiced by psychiatrists, psychologists, social workers, nurse clinicians, and lay therapists. Specific treatments have been developed for specific problems, including depression, anxiety disorders, adjustment disorders, and even schizophrenia. These are not "the worried well." In my experience, few people seek psychotherapy unless they are in pain. There has probably never been a time in which so many people practiced so many kinds of psychotherapy. Although third party payers have done their best to "carve" psychotherapy out of the normal reimbursement process, many people still receive psychotherapy benefits; others seek out treatment at their own expense.

I believe your question was really directed to the fate of *medical* psychotherapy. This is a very different situation. Fewer and fewer psychiatrists are being trained as psychotherapists. This reflects a number of factors. The dearth of insurance reimbursement is one. Another is the ascendance of neurobiological perspectives in academic psychiatry. There was a time, not long ago, when departments of psychiatry were primarily composed of psychoanalytic psychiatrists along with a smattering of behaviorists and a few biological psychiatrists. The situation is now reversed. Within psychiatry, many have raised the banner of "remedicalization" and many followed in the hopes of creating a more "scientific" specialty whose practitioners more closely resemble internists than they do psychologists. Proponents of remedicalization insist that psychotherapy should be left to psychologists, social workers, and others so that medical doctors are free to pursue the study of the brain and the treatment of brain disease. At the turn of the millenium, American psychiatry has reformed itself along lines predicted by Leon Eisenberg back in 1986: we have moved from a brainless psychiatry to a mindless one! [1]

Despite all the excitement over the new focus on the biological, it is worth noting that the number of medical students applying for psychiatric training diminished markedly over this same period. Psychiatry once attracted a particular group of medical students—those who wanted to study human nature as well as natural science. While many students still enter psychiatry, their training no longer stems from the psychodynamic perspective that once permeated American psychiatry. Instead, they master diagnostic nomenclature, biological models, and psychopharmacology: the new fundamentals. Gabbard described the result when he observed that modern psychiatric residents ". . . could diag nose a psychiatric disorder according to symptoms, course, and history, but they could not understand the person with the disorder (p. xvi)".[2] This kind of understanding is the crux of the psychodynamic tradition. If psychiatry devolves into the prescription of pills, no one will need psychiatrists at all.

Despite these changes in psychiatry, the future of psychoanalytic training is bright. In fact, the last few years have witnessed accelerated development of the psychoanalytic resources in our state. The UNC-Duke Psychoanalytic Education Program ("the Institute"), once the reserve of medical doctors, has thrown its doors open to practitioners from other disciplines (some of whom sued the American Psychoanalytic Association for the privilege—obviously, many people value psychoanalytic training). The Institute's child psychoanalytic program has expanded, in part because of the opening of the Lucy Daniels Preschool and the Lucy Daniels Foundation (these landmark psychoanalytic clinical and research programs are attracting international interest to our community). The NC Psychoanalytic Society now hosts the Psychoanalytic Psychotherapy Study Center of North Carolina, which offers introductory and advanced training for clinicians and scholars. Enrollment is healthy and continues to grow. Finally, the new North Carolina Psychoanalytic Foundation has begun its mission of engaging the community on all matters to which a psychoanalytic point of view may be relevant and helpful, including clinical, educational, family, and community programs.

I predict that psychoanalysis will continue to prosper and that the psychoanalytic tradition will be extended from the couch to the community in ways that Freud never envisioned. A field often dismissed as hopelessly arcane, dogmatic, or metaphysical is, in fact, a vital and intrinsic part of our culture. One question remains: When will psychiatry transcend brainlessness and mindlessness to achieve real thoughtfulness about problems of human illness and human nature?

Dr. Meymandi:

To understand this very important question, we must first have a good grasp of the origin and evolution of psychiatry. Psychiatry was born in the 18th century as part of the Enlightenment, a period when people inspired by the new scientific spirit were able to view mental disturbances as illnesses rather than the result of sin or witchcraft. Mental problems were thus conceived in causal terms rather than moral and religious ones. In America, Enlightenment thinkers like Benjamin Rush wrote about psychiatry (yet to be named as such) on a broad universal philosophical system than encompassed every kind of reality and force. In recent decades, the insistence that psychiatry is an integrated biosocial-psychological complex is a resurrection of 18th century thinking.

Over the past two and a quarter centuries, despite the efforts of such powerful and persuasive philosophers as Georg W. F. Hegel, attempts to integrate human knowledge and values into a single system of thought have failed. The focus of such major figures as Friedrich Nietzsche (the original psychoanalyst), Freud, and Jung on the psychological aspects of psychiatry gave birth to "sub-specialization" of the field. Finally, Austrian Wagner Von Jauregg, the only psychiatrist Nobel Prize winner, who used high fever produced by malaria inoculation to treat tertiary syphilis, opened the doors to the possibilities of biological psychiatry. The discovery of neuroleptics and thymoleptics and the effective treatment of serious major mental illnesses led to the emptying of the nation's state mental hospitals. The 1990s were dubbed the "Decade of the Brain."

These rapidly occurring events, along with managed care's financial restraints on the analytic model of psychotherapy, seem to have jeopardized the very health and survival of psychotherapy. But the truth is far from the superficial appearances. Psychotherapy is alive, well, and thriving.

In our capitalistic, legalistic, and technoractic society, it is easy to relegate the success and failure of any endeavor or project to funding, insurance, reimbursement, and earnings. However, as biological and social aspects of psychiatry expand, so does the need for introspection, exploration of "self," the soul, faith and spirituality in treating and healing human ills. Psychotherapy is a fundamental research tool of "self." Psychotherapy will continue to thrive and develop as understanding of biological and social psychiatry expands. I believe that the drug industry and other sources of funding will soon realize the benefits of psychotherapy in developing their own business, and start funding residency training programs rooted in psychoanalytically oriented psychotherapy. The managed care crunch is perceived as a crisis. I suggest it is an unparalleled opportunity to re-examine the traditional model of long-term psychotherapy and replace it with a more efficient and shorter term paradigm. As members of the profession, we do need to energize ourselves and meet the challenge of managed care by becoming more relevant, more accountable, more disciplined, more innovative, and more responsive to the needs of our patients. The traditional perception of psychiatry as a profession that intuits rather than explicates must change. We will achieve these goals, because psychiatry is fortunate to attract brilliant, intelligent, motivated and industrious basic and clinical researchers. The need to make psychotherapy more scientifically based is our primary challenge. Psychotherapy needs to return to its roots in the enlightenment. I am very optimistic about the future of psychotherapy. ❐

References

1 Eisenberg, L. (1986). Mindless and brainless in psychiatry. *British Journal of Psychiatry*, 148; 497-508.

2 Gabbard, G.O. (1994). *Psychodynamic Psychiatry in Clinical Practice, the DSM-IV Edition.* American Psychiatric Press, Washington, DC.

Carolina Physician's Bookshelf

Edward C. Halperin, MD, Section Editor

New Books, Briefly Noted

Understanding cancer: a patient's guide to diagnosis, prognosis, and treatment

by CN Coleman

Baltimore, MD: The Johns Hopkins University Press, 1998, ISBN 0-8018-6020-2 (paperback), $13.95.

I was in Philadelphia as a visiting Professor at the University of Pennsylvania. My hosts put me up in a fancy hotel on Rittenhouse Square. I was taking an evening stroll and came upon one of those mega-bookstores that are all the rage - this particular one was called "Borders Books". I think everything ever published since the Guttenberg Bible was on sale at the moment.

Browsing in the health section I came upon Dr. Coleman's new book. Coleman is board certified in Internal Medicine, Medical Oncology, and Radiation Oncology. He was on the faculty at Stanford and, subsequently, held an endowed Chair at Harvard Medical School. Currently he is at the National Cancer Institute in Bethesda, Maryland.

The book is, simply, marvelous. It is a 160 page paperback that provides patients with commonsense information about the diagnosis and treatment of cancer. Patients are given advice concerning what questions to ask, how to make a treatment decision, and how to deal with the consequences of their decisions. The material on cancer statistics is particularly well done. I have recommended it to my faculty and medical students.

Practicing physicians would be well advised to recommend this book to patients, to give out copies as a health education tool, and to recommend it to colleagues. I hope that Johns Hopkins Press makes the book available for bulk purchases - I am considering buying it and handing it out to new patients at our cancer center.

Dr. Coleman deserves hearty congratulations for this first rate piece of work.

How to have therapy in an epidemic: cultural chronicles of AIDS.

by PA Treichler

Durham, NC: Duke University Press, 1999, (ISBN 0 8223 2286 2), $22.95.

From time to time the North Carolina Medical Journal receives unsolicited books for review. Professor P.A. Treichler's book appeared in the office one day, unannounced, courtesy of the Duke University Press.

The book will, I fear, be of little interest to most of this Journal's readers. The collection of essays falls within the discipline of "cultural studies" i.e. analyses of the way the AIDS epidemic is understood by the media and the public. There is a particular emphasis on the choice of images in the popular press. The prose is dense. I sense that it is the style used by professors in the arts and humanities to communicate with each other in their scholarly journals.

Readers are invited to submit for review books of potential interest to *Journal* audiences, including works on any aspect of medicine, or by North Carolina physicians. Send them to Dr. Halperin at Box 3085, DUMC, Durham NC 27710.

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CME Calendar

January 10-12

Problem-Solving in Interventional Cardiology

Place: American College of Cardiology Learning Center, Bethesda, MD
Credit: Up to 21 hours, Category 1, AMA
Fees: $549 for ACC members; $599 for nonmembers
Info: Resource Center, Am. College of Cardiology, PO Box 79231, Baltimore MD 21279-0231; 800/253-4636

January 23-30

Winter Urologic Forum

Place: The Peaks Resort & Spa, Telluride, CO
Credit: 21.5 hours, Category 1, AMA
Info: Duke Office of CME; Division of Urologic Surgery
Information Email: mace0001@mc.duke.edu
Registration: 919/684-2033

February 14-18

Current Concepts in Women's Imaging, Winter Postgraduate Meeting

Place: El Conquistador, Puerto Rico
Credit: 22.25 hours, Category 1, AMA
Info: Duke Office of CME; Department of Radiology
Information email: bynum006@mc.duke.edu
Registration: 336/768-1680 ext. 736

February 17-18

14th Annual Joseph & Kathleen Bryan Alzheimer's Disease Research Center Conference

Place: Durham Civic Center
Credit: Up to 10 hours, Category 1, AMA
Fees: $45 either day; $75 for both days
Info: 919/660-7510 or (NC only) 800/672-4213

March 6-10

The Alton D. Brashear Postgraduate Course in Head and Neck Anatomy

Place: Virginia Commonwealth University School of Medicine, Richmond, VA
Credit: 43 hours, Acaedmy of General Dentistry
Fees: $450 physicians/dentists; $300 residents
Info: Dr. Hugo R. Seibel VCU Dept. of Anatomy Tel 804/828-9791.

March 14-19

Duke Urologic Assembly

Place: Caesar Park Beach & Golf Resort, Cancun, Mexico
Credit: 16.0 hours, Category 1, AMA
Info: Duke Office of CME; Department of Urlogic Surgery
Information Email: mace0001@mc.duke.edu
Registration: 919/684-2033

March 24-26

2nd Annual Clinical Relevance of Medicinal Herbs and Nutritional Supplements in the Management of Major Medical Problems

Place: Friday Center, UNC-Chapel Hill
Credit: Up to 17 hours, Category 1, AMA; 20.1 hours, ANCC; 16 hours, pharmaceutical education
Fees: $385 doctoral level; $275 professional level
Info: Office of CME, UNC-Chapel Hill; 919/962-2118

March 29-April 2

International Conference on Physician Health

Place: Seabrook Island, South Carolina
Credit: Up to 23 hours, Category 1, AMA; family physician CME credit also available
Fees: AMA/CMA members $195 pre-reg., $250 on site; non-member physicians $500; residents $120/$200; students $75/$150
Info: Cosponsored by AMA and the Canadian Medical Association. For abstract forms, registration and fee information: AMA Physician Health Program, 515 N. State St., Chicago IL 60610; 312/464-5066 or 800/621-8335; *email*: elaine_tejcek@ama-assn.org.

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Instructions for Authors

The *North Carolina Medical Journal* is a medium for communication with and by members of the medical community of this state. The *Journal* publishes six times a year: in January, March, May, July, September, and November.

The *Journal* will consider for publication articles relating to and illuminating medical science, practice, and history; editorials and opinion pieces; letters; personal accounts; poetry and whimsical musings; and photographs and drawings. Papers that relate to the present, past, or future practice of the health professions in North Carolina are especially pertinent, but manuscripts reflecting other perspectives or topics are welcomed. Prospective authors should feel free to discuss potential articles with the editors.

Manuscript Preparation

Prepare papers according to the "Uniform Requirements for Manuscripts Submitted to Biomedical Journals" (N Engl J Med 1991;324:424-8) with the following exceptions: 1) no abstract is needed; 2) no running title is needed; and 3) report measurements in metric units; use of the International System of Units (SI) is optional.

Submit a cover letter and a 3 1/2-inch computer disk that contains the text written in MS DOS- or Macintosh-compatible format. *Also enclose three hard copies of the text for review purposes.* Double space text with one-inch margins. *Please do not "format" the text* (e.g. no variations in type size, no bold face, no italics, no embedded endnotes).

Submit photographic illustrations, in duplicate, as high-quality color 35mm slides or 5-by-7 or 8-by-10-inch glossy prints, or as black-and-white glossy prints (5-by-7 or 8-by-10-inch). Label all illustrations with author's name, number them sequentially according to their position in the text, and indicate the orientation of the images, if necessary. *Do not write directly on the backs of prints.* This can damage them. If figures require printing in four-color process, we may ask the author to pay printing fees or a portion thereof.

Submit tables, charts, and graphs as hard copy *and* include copies on disk, in their original format *and translated as TIFF, PICT, or EPS documents.* Type all figure legends separately. Type and double-space all tables, one to a single sheet of paper. Tables must have titles and consecutive Arabic numbers.

Keep references to a minimum (preferably no more than 15), retaining those that document important points. The "Uniform Requirements" cited above contain reference format. We customarily list the first three authors for "et al"-type references. Authors are responsible for the accuracy and pertinence of all citations.

Avoid abbreviations entirely if possible; keep them to a minimum if not. When used, completely define abbreviations at the first point of usage in the text.

Manuscript Review and Editing

A medically qualified editor reads all manuscripts and, in most instances, sends them out for further review by one or more other members of the North Carolina Medical Society. *Authors' cover letters must include a line that states that their submitted manuscripts are not under consideration for publication elsewhere. It is not the Journal's policy to reprint previously published articles.* Decisions to publish or not are made by the editors, advised by the peer reviewers.

We encourage a relatively informal writing style since we believe this improves communication. Imagine yourself talking with your unseen audience—as long as this doesn't lead you to scientific or linguistic inaccuracy. Be brief, clear, simple, and precise.

We edit accepted manuscripts for clarity, style, and conciseness. Except for letters, authors receive a copy of the edited manuscript for their review and approval before publication. Manuscripts not accepted will not be returned.

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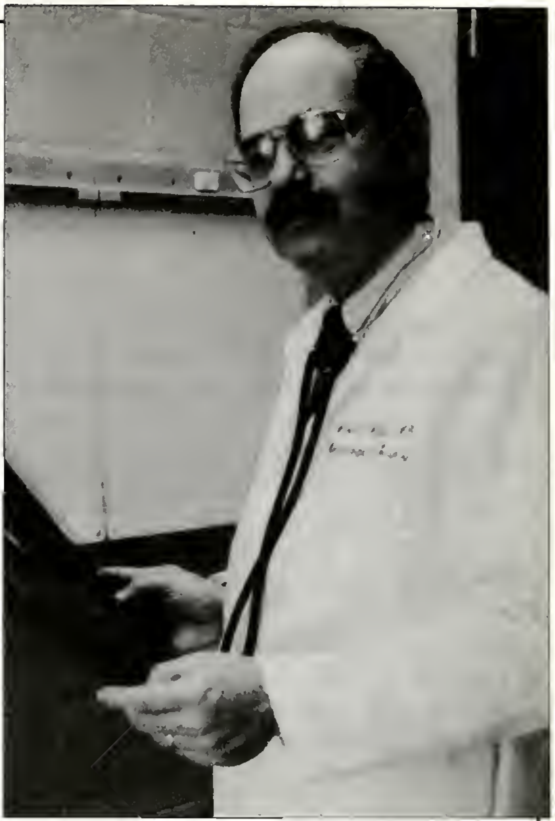

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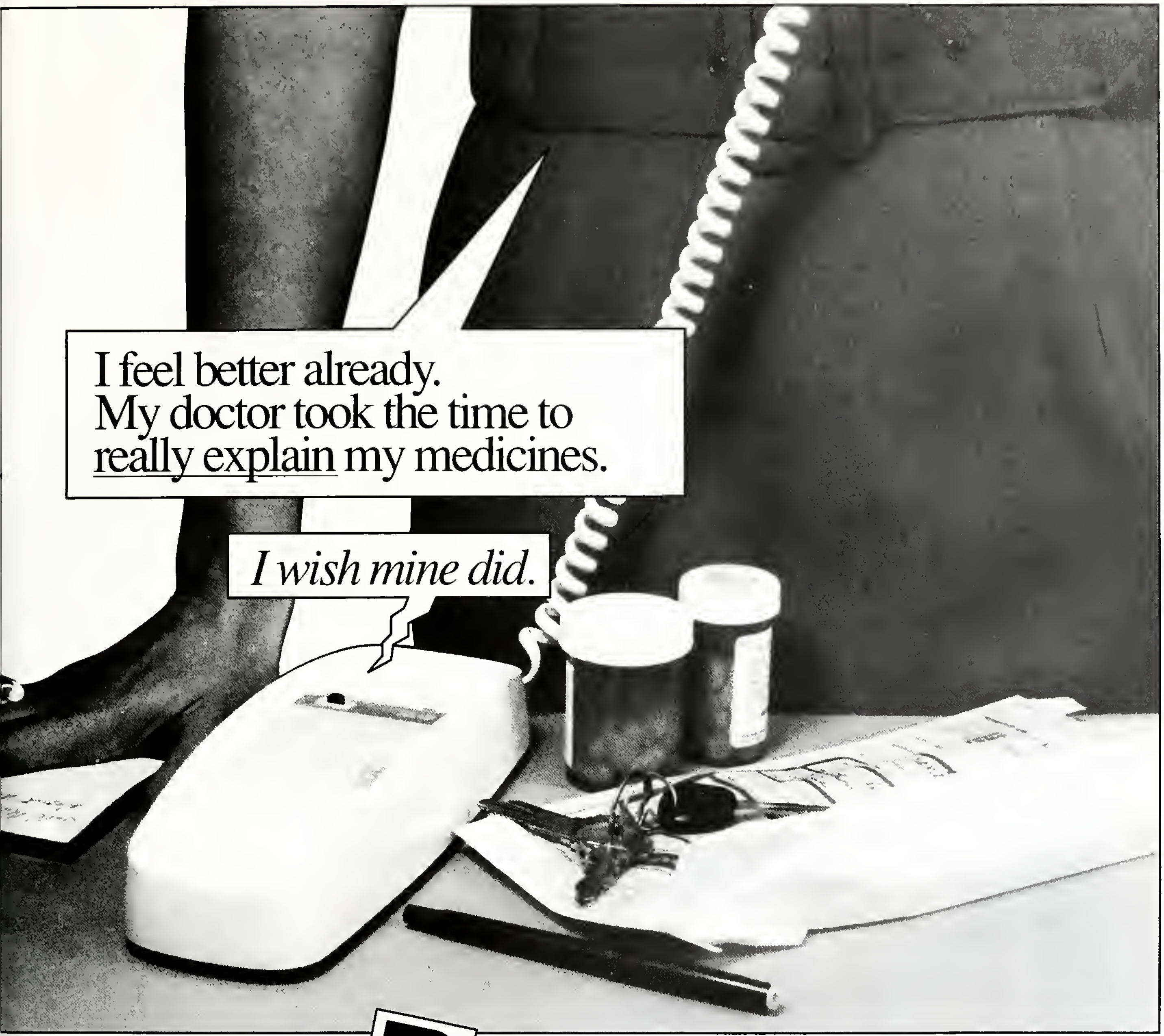

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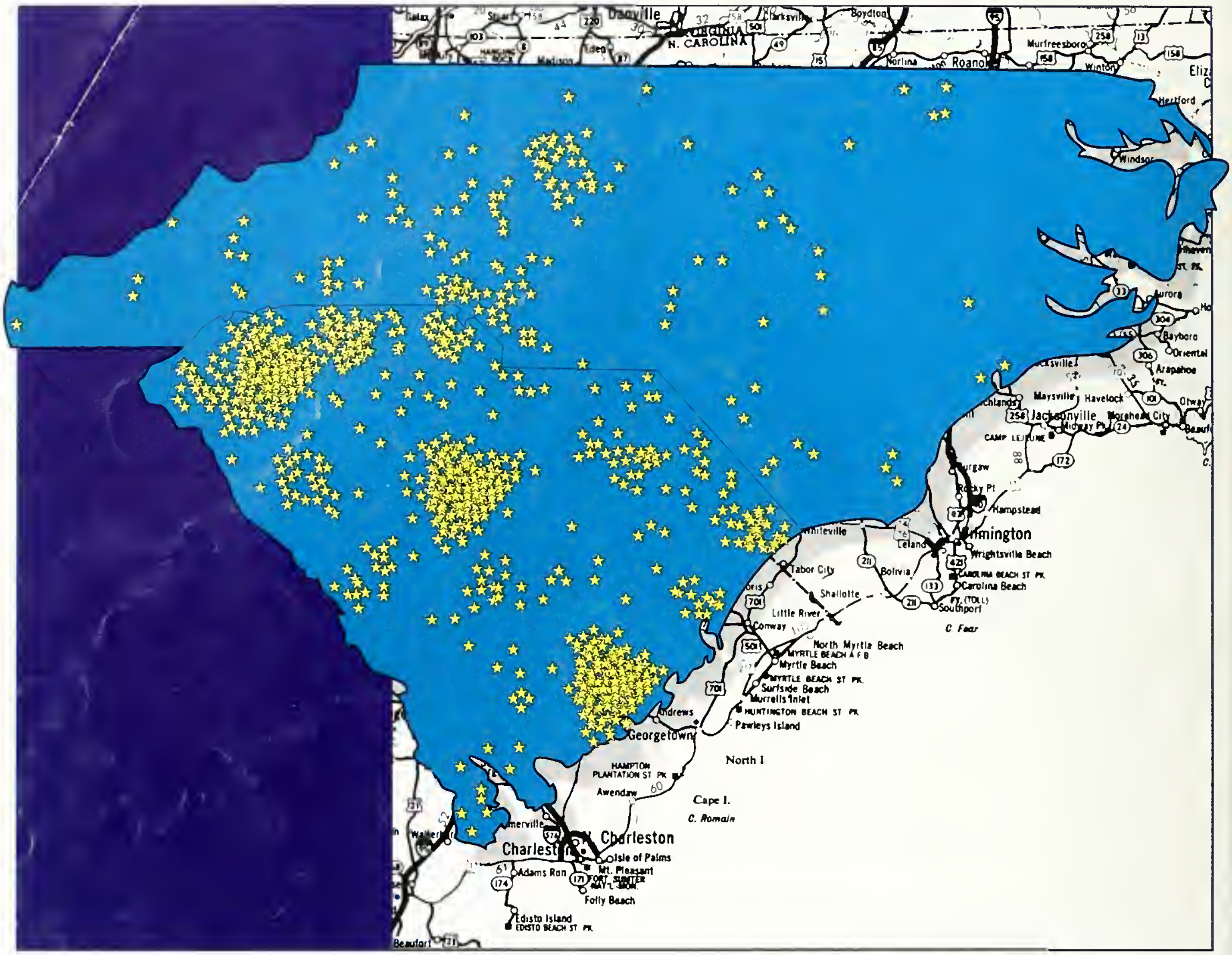

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For Doctors and Their Patients

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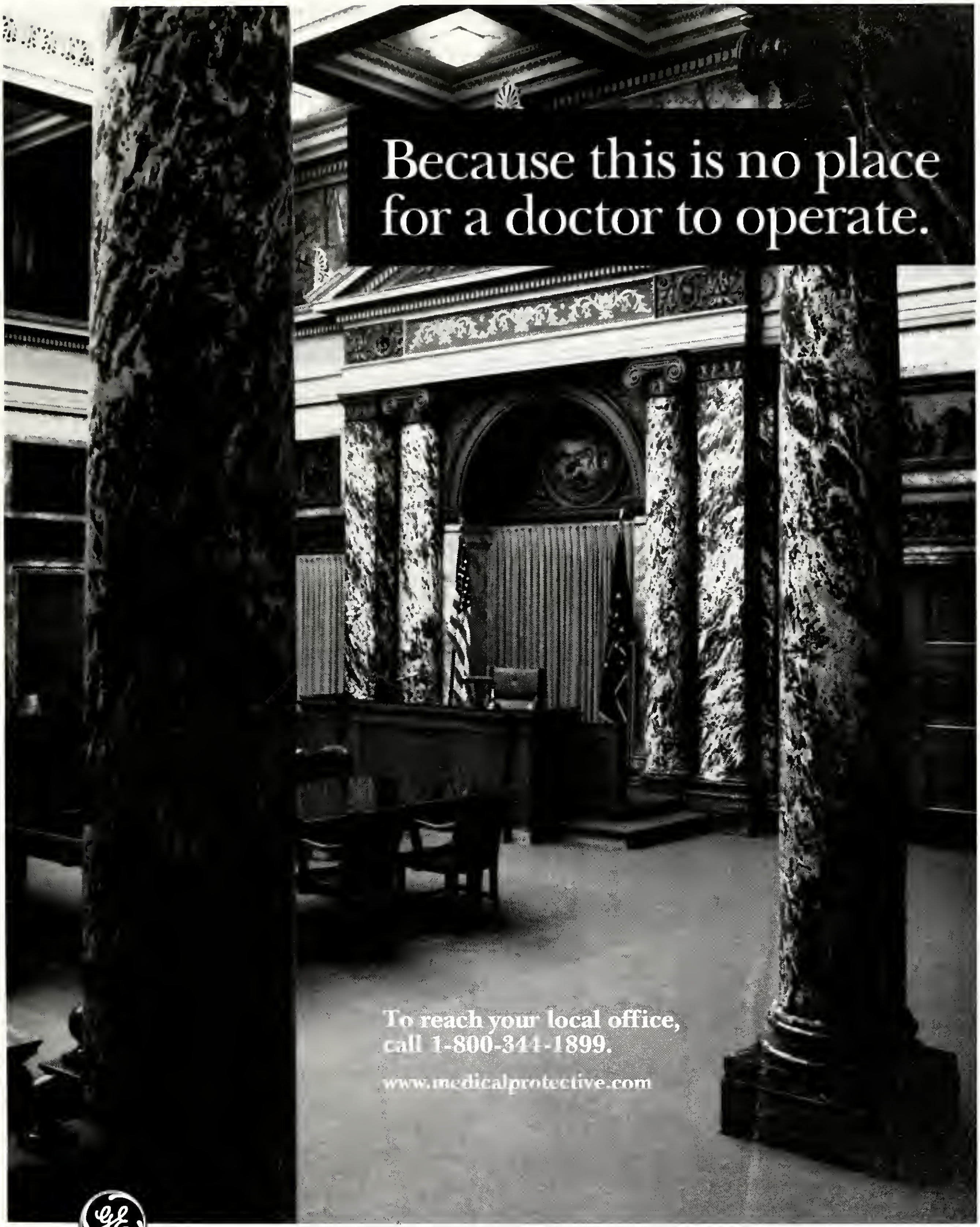
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For Doctors and Their Patients

March/April 2000, Volume 61, Number 2

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March/April 2000, Volume 61, Number 2

Cover: "Bedlam" from *The Rake's Progress*, by 18-century English artist William Hogarth. This 1732 engraving shows the Rake at the final stage of his decline and degradation: confined to the madhouse. Treatment of the mentally ill changed distressingly slowly—until the drug therapy revolution. Inside, a personal perspective and reminiscence on the treatment of psychosis and the advent of chlorpromazine. Illustration courtesy of the Duke University Libraries Special Collections.

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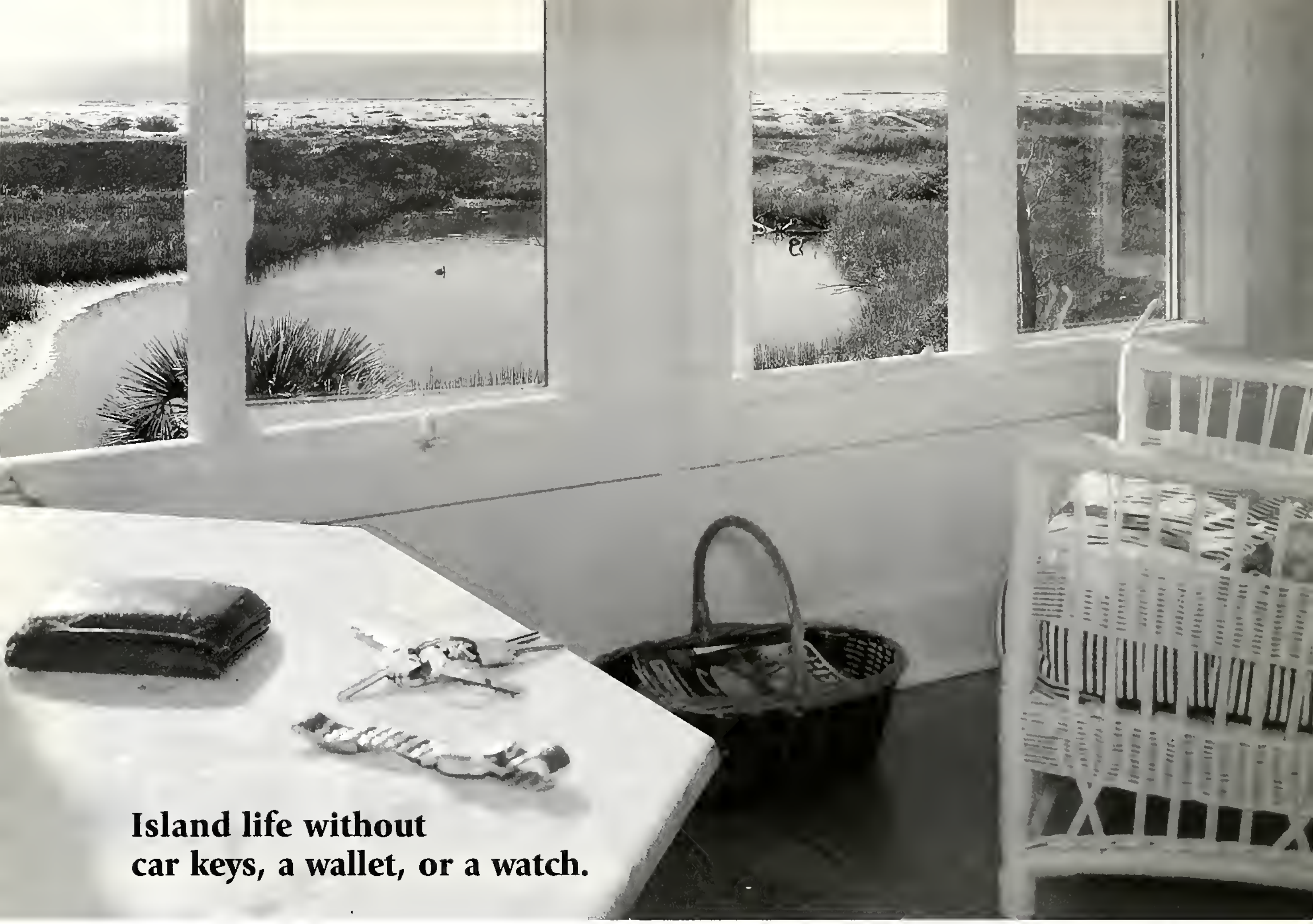

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Letters to the Editor

Pepper Spray Lingers in the Air . . .

To the Editor:

Your recent cover article on the health hazards of pepper sprays (NC Med J 1999;60:268-74) mentioned my lawsuit Ryder v. Freeman. Citing another report, Drs. Gregory Smith and Woodhall Stopford wrote that the judge's ruling had been "reversed." Judge Lacy Thornburg then wrote to you (NC Med J 1999;60:314 [letter]) saying that he had not been reversed, but that his order had been "vacated."

This is true, but the legal community generally does not split hairs to this degree. Cases that are over-ruled as "reversed," "vacated," "held in error," etc. are commonly referred to as "reversals."

Thornburg himself did just that when he filled out his Questionnaire for Judicial Nominees (Hearings Before the Committee on the Judiciary, United States Senate, February 8 - June 27, 1995, pp. 76-85). He was asked to submit "a short summary of and citations for all appellate opinions where your decisions were reversed or where your judgment was affirmed with significant criticism of your substantive or procedural rulings." He answered this by stating, "I include herewith a citation to each case over which I presided that was *reversed* [italics added] in whole or in part by an Appellate Court, as well as a short comment to indicate what the case was about." He listed 77 cases, averaging approximately 4.27 reversals per year—twice as many as the next highest of the judges with whom he went through the confirmation process. Of these 77 cases, at least six were "vacated," and several were returned for "error."

Thornburg was the Attorney General whose office made the policy to force correctional officers and state troopers to be sprayed in the face with this untested weapon/product. Any officer who refused was fired. Thornburg's list of campaign contributions submitted to the Board of Elections shows money given to him by the PAC representing the pepper spray supplier to state agencies. Thornburg did not recuse himself, as mandated by law, but threw out my case.

The subject of pepper spray has become an extremely embarrassing one for him, but that's no excuse to attempt to case a shadow on the work of these two fine doctors.

Ann Ryder
481 Wolf Pit Road
Mars Hill, NC 28754
ryderann@aol.com

To the Editor:

I recently had occasion to review the existing literature on the adverse human health effects of riot control agents, including pepper spray. Unfortunately (perhaps) there is very little in the medical literature on these agents. I found the publication on human health effects of pepper spray by Drs. Smith and Stopford (NC Med J 1999;60:268-74) to be a very useful summary of the literature on this topic. I am also pleased to say we have nothing new to report in this area.

Jeffrey S. Duchin, MD
Chief, Communicable Disease Control and Epidemiology
Public Health - Seattle and King County
999 Third Avenue, Suite 900
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NC Med J Keeps Delivering the Goods

To the Editor:

I recently had the opportunity to present lectures and discussions on the issue of physician and physician assistant impairment. While researching the published literature, I came upon the North Carolina Medical Journal issue devoted to this topic (NC Med J 1996;57[4]). I found all of the articles well written, fully researched, and tremendously helpful for my presentations. In particular, an excerpt from the article by the anonymous physician relating her/his problems with alcoholism captivated my audiences and led to lively, productive discussions at the locations of both presentations (Florida and Connecticut). It was also interesting to note that your article on physician assistance impairment was the only one I could find specific to this topic.

Thanks for the informative and academically useful publication.

Jeffrey G. Wong, MD
Associate Clinical Professor of Medicine
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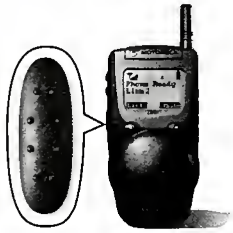

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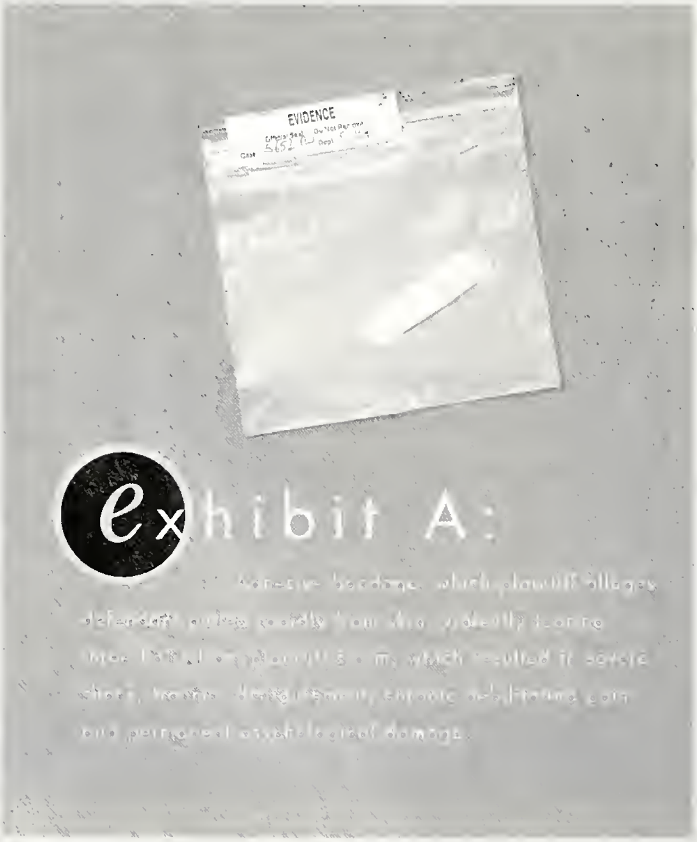

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Outpatient Cardiac Rehabilitation in North Carolina

Kelly R. Evenson, PhD, and Wayne D. Rosamond, PhD

The rate at which North Carolinians die from cardiovascular disease has declined in recent years, but the absolute number of deaths due to cardiovascular disease continues to increase.[1] In 1995, heart disease was responsible for 31% of deaths in North Carolina (the 8th highest death rate from cardiovascular disease in the United States[1]). That high death rate is due to the prevalence of cardiovascular risk factors such as physical inactivity, smoking, hypertension, and obesity, as well as to factors related to treatment of cardiovascular disease.[1] For those who have had a myocardial infarction, coronary artery bypass, grafting surgery, coronary angioplasy, or who have a stable angina, cardiac rehabilitation is an important and recommended component of treatment.[2]

Cardiac rehabilitation services involve medical evaluation, cardiac risk factor modification, exercise prescription, counseling, and education.[2] Cardiac rehabilitation restores, maintains, or improves physiological and psychosocial patient outcomes through symptom relief, improved functional capacity, exercise tolerance. ability to return to work, blood lipid levels, and reduced rates of smoking and stress.[2,3] One study of myocardial infarction in patients 65 years of age and older found that participation in cardiac rehabilitation significantly decreased subsequent hospitalizations and emergency department visits.[4]

Despite its benefits, cardiac rehabilitation is not used often enough.[2,5] We therefore carried out a cross-sectional study to assist North Carolina cardiac rehabilitation programs in planning for the future.

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Methods

A 5-page questionnaire was developed to assess the geographic distribution, type of program, services offered and available, and professional training, patient population, and daily practice patterns of outpatient cardiac rehabilitation programs. The questionnaire was pilot tested in several out-of-state programs, reviewed by several experts, and modified accordingly.

A master list of the 72 cardiac rehabilitation programs existing in North Carolina in 1998 was obtained from the North Carolina Association of Cardiovascular and Pulmonary Rehabilitation. In January 1999, the questionnaire was mailed to the directors of the programs. Individuals who failed to respond were contacted twice by mail and once by phone. Eventually, 85% (61/72) of the identified programs responded.

Cardiac rehabilitation has traditionally been divided into three phases. Phase I represents inpatient rehabilitation, and Phases II and III represent outpatient rehabilitation. Phases II and III are distinguished from each other by the use of telemetry (Phase II often uses semi-continuous or continuous monitoring) and length of time after hospital discharge or cardiovascular event (Phase II being closer to discharge or event).

ArcView® GIS 3.0[6] was used to generate a map of North Carolina showing the location of cardiac rehabilitation programs. Mapping was based on zip code, and the program was mapped in the center of each zip code region. The availability of programs was assessed by county and region (Tidewater, Coastal, Piedmont, or Mountain). The United States Department of Agriculture (USDA) rural-urban continuum codes were used to define location in an urban or rural county.[7,8] Five rural-urban categories were created: central or fringe counties with metropolitan areas of 1 million or more, coun

Table 1: Location and longevity of cardiac rehabilitation programs in North Carolina

	Phase II (n=53)		Phase III (n=59)	
Location of program				
Hospital	31	(58%)	31	(53%)
Physician office/medical clinic	6	(11%)	6	(10%)
School, college, or church	2	(4%)	4	(7%)
Fitness facility	11	(21%)	15	(25%)
Rehabilitation center	3	(6%)	3	(5%)
Year program began				
1975-79	4	(8%)	7	(12%)
1980-84	6	(11%)	9	(15%)
1985-89	12	(23%)	13	(22%)
1990-94	14	(26%)	12	(20%)
1995-98	17	(32%)	18	(31%)

ties with metropolitan populations less than 1 million, those with urban population of 20,000 or more, those with urban population 2500-19,999, and completely rural counties with an urban population of less than 2500. The USDA urban influence codes were used to define whether a cardiac rehabilitation program was located in an urbanized county.[7,8] Counties were classified into 3 categories by population of county: 1 million or more, 10,000 to 1 million, and less than 10,000.

Results

Of the 61 programs responding to our survey, 53 offered Phase II services and 59 offered Phase III services; 55% of the programs also offered pulmonary rehabilitation. Table I shows the location of these programs and the year in which they began operating; the oldest responding program began in 1975. Most programs are organized around a hospital.

Program directors were asked to estimate the number of cardiac rehabilitation patients attending in 1998. The median number attending Phase II during 1998 was 60 (range 10-420) and that for Phase III was 53 (range 5-480). In 1998, the total estimated number of patients attending the 61 programs for Phase II rehabilitation was 4896 and for Phase III, 3958 (some patients attended both).

Geographic Location of Programs. The map (Figure) shows the location of programs existing in 1998. The Mountain region had the greatest number of counties with programs and

Table 2: Geographical distribution of cardiac rehabilitation programs in North Carolina

	No. of counties in region (n=100)	Counties with outpatient cardiac rehabilitation programs (n=50)		
		1 prog.	>1 prog.	total
Region				
Tidewater	18	7	0	7 (39%)
Coastal	23	11	0	11 (48%)
Piedmont	35	12	5	17 (49%)
Mountain	24	10	5	15 (63%)
USDA Rural-Urban Continuum Codes				
≥1 million metropolitan area	7	3	1	4 (57%)
<1 million metropolitan area	28	12	4	16 (57%)
≥20,000 urban area	8	6	1	7 (88%)
2500-19,999 urban area	35	16	3	19 (54%)
<2500 urban or rural area	22	3	1	4 (18%)
USDA Urban Influence Codes				
>1 million	35	15	5	20 (57%)
10,000 to 1 million	43	19	3	22 (51%)
< 10,000	22	6	2	8 (36%)

the Tidewater region had the fewest (Table 2). Fifty of North Carolina's 100 counties had at least one cardiac rehabilitation program; 8 counties had 2 programs, and 1 had 3.

According to USDA rural-urban continuum codes, rural counties had the lowest percentage of cardiac rehabilitation programs (Table 2). Counties with a metropolitan population of 1 million or more had 25 programs and those with 10,000 to 1 million people had 26, compared to counties with fewer than 10,000 people, which had only 10. However, 61% of Program Directors considered their programs to be located in rural areas; 18% said suburban, and 21%, urban areas. Program Directors estimated that the maximum median distance traveled by patients to attend their program was 30 miles (range 4-90 miles).

Table 3: Personnel and services provided at 61 outpatient cardiac rehabilitation programs in North Carolina

	Percent of programs offering
Services	
Nutritional counseling	100%
Stress management	98%
Aerobic exercise	93%
Vocational counseling	93%
Pharmacy / medication education	89%
Weight training	82%
Smoking cessation	82%
Weight loss counseling	77%
Patient support group	46%
Spouse support group	40%
Cardiopulmonary resuscitation classes	33%
Personnel	
Nursing	98%
Exercise physiology	84%
Nutrition	82%
Psychologist or social worker	36%
Student in training	18%
Respiratory therapist	10%
Physical therapy	8%

Practice Patterns in Cardiac Rehabilitation Facilities. The use of telemetry monitoring varied by program. Most programs (62%) provided continuous telemetry cardiac monitoring for all patients, but 19% used continuous monitoring only for high risk patients; 11% provided intermittent monitoring, and 8%, none at all.

Less than half (41%) of Phase II programs tracked or followed patients from Phase I through follow-up care, but 86% of Phase III programs tracked patients from Phase II. Since the distinction between Phase II and Phase III varied among programs, we have not stratified the remaining results by Phase.

Patient Population. Program Directors estimated that the majority of participants were white (median estimate, 90%; interquartile range, 82-99%), with fewer African-Americans (median estimate, 6%; interquartile range, 1-12%), and virtually no Hispanics or Native Americans (median estimate, 0%). Participants were more likely to be men (median estimate, 65%; interquartile, range 60-70%) than women. Only

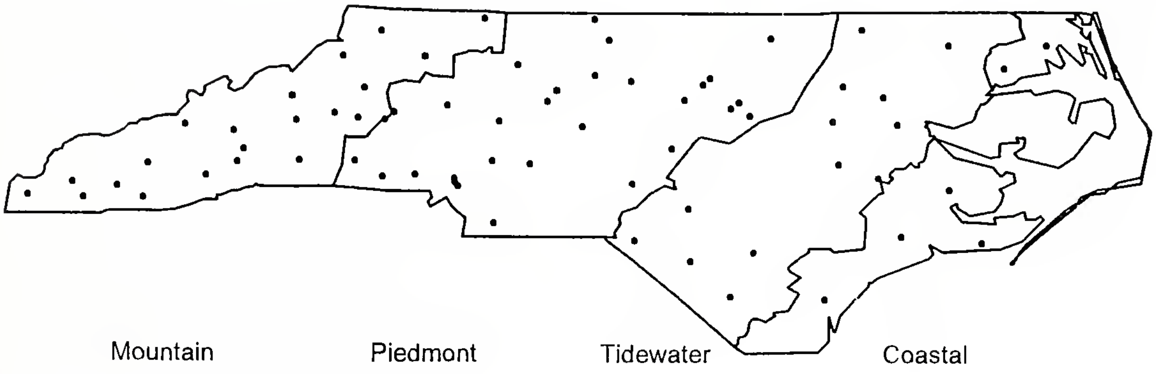

Figure. Map of North Carolina divided into four regions with location of outpatient cardiac rehabilitation programs.

4 programs stated that they operated at full capacity all of the time, and 12 programs stated that they never reached full capacity.

Program Services and Ownership. Outpatient cardiac rehabilitation programs offered a variety of services, including nutritional counseling, stress management, aerobic exercise, vocational counseling, medication classes, weight training, and smoking cessation programs (Table 3). Most (88%) programs were owned by hospitals; 4 (7%) were owned by physicians, physician's offices or medical clinics; 2 (3%) were owned partially or fully by an educational institution; and 1 (2%) was operated as a nonprofit business.

Personnel and Certification. Most programs were staffed by personnel with training in nursing, exercise physiology, or nutrition (Table 2). Some programs used other professionals (psychologists, social workers, respiratory therapists, physical therapists) and some accommodated students in training. Nearly all programs (97%) employed at least one person with Advanced Cardiac Life Support certification, and 80% employed at least one person certified by the American College of Sports Medicine (3 Exercise Test Technologists, 58 Exercise Specialists, and 12 Program Directors).

Discussion

Our survey of outpatient cardiac rehabilitation programs operating in North Carolina in 1998 found that fewer than 5000 patients were using the respondent services. The magnitude of patients eligible for such services is considerably larger. Consider that in one recent year (1995-6) approximately 114,361 people were hospitalized in North Carolina for ischemic heart disease, plus another 45,082 for congestive heart failure, and 77,721 for other cardiovascular diseases.[9] Furthermore, between 1994 and 1996 the rate of hospitalization for cardiovascular disease increased 8% among Medicare beneficiaries aged 65 years and older.[10] Not every one of these patients would be eligible for rehabilitation, but even the most conservative estimate emphasizes the low rate of utilization.

From 1991 to 1995, nearly half (46%) of all coronary heart disease deaths in North Carolina occurred in women, but we found that cardiac rehabilitation use by women was lower than that by men. Even more problematical is the low rate of participation by minorities despite the fact that between 1980 and 1994 the age-adjusted death rates for coronary heart disease in North Carolina adults aged 35 years or older were higher for African-Americans than for whites.[1]

The Tidewater and then the Coastal regions had the lowest percentages of counties with cardiac rehabilitation programs. Unfortunately, these areas also had the highest death rates from cardiovascular disease.[1] In several eastern counties, death rates for heart disease were actually higher in 1991-1995 than in 1986-1990, while death rates in many of the remaining counties in the state remained stable or declined.[1] Additionally, from 1995 to 1996, hospital discharge rates for ischemic heart disease and hypertension were higher in northeast, southeast, and western border counties.[9]

In North Carolina, heart disease mortality rates are higher in rural counties than in urban counties.[1] As expected, we found that the number of cardiac rehabilitation programs is lowest in rural counties. Referral for cardiac rehabilitation is more likely when a facility is located in the county where the patient lives.[11] Certainly, having to travel a long distance can be a deterrent to attending a rehabilitation program.[11-13] According to our survey respondents, 30 miles is the average maximum distance patients traveled to rehabilitation, but there are localities in our state with no cardiac rehabilitation program within this driving distance. We need more programs or alternative programs to reach patients living in rural and underserved areas of North Carolina.

According to our survey, cardiac rehabilitation programs offered a variety of services. Still, there were a number of barriers to referral and participation. Less than half of the Phase II programs tracked or followed patients from Phase I to follow-up care. We clearly need improved continuity of care since cardiac rehabilitation is part of standard treatment. In-hospital physicians and cardiac staff can facilitate continuity into outpatient cardiac rehabilitation by including it as part of discharge planning.[14] And outpatient programs could consider redesigning themselves to include a pretraining or transitional period.[14]

The training and services available at the cardiac rehabilitation facilities in North Carolina are considerable and exist in all regions of the state. It may be necessary to create more facilities or develop alternative programming in order to reach a higher percentage of those patients for whom cardiac rehabilitation is recommended. There is more to learn about barriers to referral and participation in programs, as the future of North Carolina cardiac rehabilitation is planned. ❐

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Slowing the Progression of Chronic Renal Insufficiency

Steven Crowley, MD

There are at least three reasons why doctors should be adept at managing chronic renal insufficiency (CRI):

1. CRI is extraordinarily common and will become more so as the population ages. The problem is that CRI leads to end-stage renal disease (ESRD), which has a high mortality and costs a lot of money. In 1996, the highest prevalence of ESRD in the US was found in individuals aged 45-64,[1] and this group also had the most incident cases of ESRD (25,417 new cases in 1996). Because this segment of the population will become our elderly during the next 20 years, and because of improved survival in ESRD—despite a relative reduction in annual new cases since the late 1980s—we can anticipate that the US prevalence of ESRD will grow at about 6% per year.

2. Despite improved techniques for hemodialysis (HD), mortality of patients on HD—especially that due to cardiovascular disease—remains quite high. According to the 1998 US Renal Data System, less than 20% of patients aged 50-54 who start HD survive for 10 years.[1] Excess mortality ranges from 22% (for Caucasian women) to 35% (for African-American men).

3. Hemodialysis, peritoneal dialysis, or kidney transplantation for patients with ESRD produces substantial costs to society. For example, in Detroit healthcare costs per ESRD patient run $3500 per month or $42,000 per year,[2] only 8% of which is attributed to physician fees. It is easy to see from these figures why ESRD care costs the US many billions of dollars every year.

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Recognizing CRI

In order to manage CRI, clinicians need a way to detect and monitor the progression of CRI and the response to intervention. The simplest indication of renal insufficiency is a serum creatinine (SCr) concentration above 1.2–1.4 mg/dL. Actual kidney function (the glomerular filtration rate or GFR) is estimated by the 24-hour creatinine clearance (CrCl), defined as the volume of serum cleansed of creatinine per minute, and calculated by the formula:

$$\text{CrCl} = \frac{\text{(Urine Creatinine Concentration)} \times \text{(24-hr Urine Volume)}}{\text{(Serum Creatinine Concentration)} \times \text{(1440 Minutes)}}$$

CrCl is preferable to simple measures of serum Cr because the CrCl declines directly as renal function declines. There is an inverse relationship between SCr and CrCl (see Figure), which means that a seemingly tiny change in SCr—say from 0.7 to 1.4mg/dL—can indicate a 50% decrease in CrCl. Nevertheless, the CrCl has shortcomings. It may overestimate the true GFR because failing kidneys may secrete a greater proportion of creatinine into the proximal tubules than is filtered at the glomerulus. GFR itself may overestimate current kidney function because of glomerular hyperfiltration that occurs in the early phase of glomerular disorders such as diabetic nephropathy (in these conditions, a rise in CrCl may actually reflect early progression of kidney disease). Despite its problems, CrCl is useful for following CRI over time.

It is certainly true that clinicians should act promptly whenever they note incremental increases in SCr, and should calculate CrCl if there is any question. Previous serum creatinine measurements may show that renal insufficiency is chronic rather than acute. Acute changes must be investigated systematically, ruling out volume depletion as a cause of prerenal azotemia and using renal ultrasound and measurement of post-void residual bladder urine to exclude urinary tract obstruction.

Ascertaining the etiology of CRI can guide treatment. In younger patients, congenital kidney disease, interstitial nephritis, or a glomerulonephritis are the common causes of CRI; diabetes mellitus (DM) and hypertension (HTN) become more prevalent with advancing age and caused 39% and 25%, respectively, of new cases of ESRD between 1992 and 1996. Patients with Type 1 DM have a higher prevalence of ESRD, but there are more incident cases of CRI in patients with Type 2 DM because there so many more patients with Type 2 DM. In African Americans, 40% of cases of ESRD are attributed to HTN, emphasizing the importance of blood pressure control in this population. In Native Americans and Asian Americans, DM and glomerulonephritis are the prevalent causes of CRI.[1]

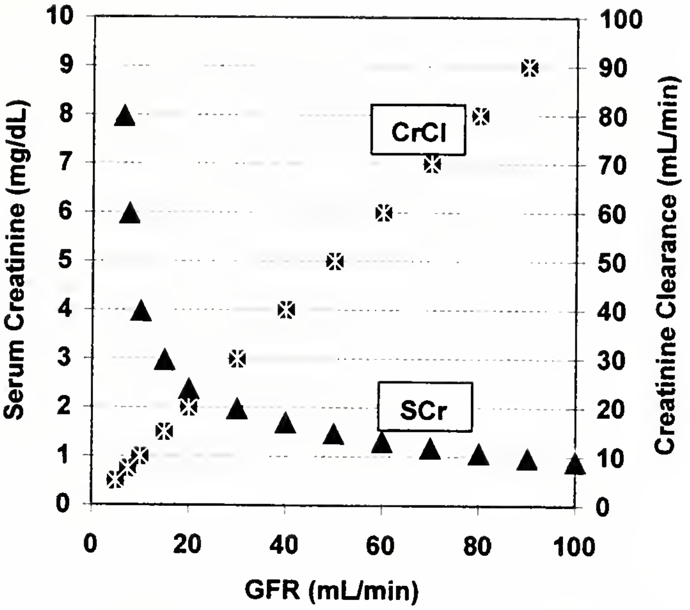

Figure. Graphical representation of the theoretical relationship between kidney function (glomerular filtration rate, or GFR) and serum creatinine (SCr) and creatinine clearance (CrCl). SCr rises hyperbolically as kidney function fall, whereas CrCl falls linearly as kidney function falls.

Slowing the Progression of CRI

We do not have space here to discuss the management of specific renal diseases, but certain interventions to slow the progression of CRI are broadly applicable. Control of HTN and of DM clearly slows the progression of CRI; data supporting dietary protein restriction are less compelling.

Hypertension Control. HTN is the cause of 30% of cases of ESRD. The incidence of ESRD attributable to HTN is rising at 9% per year, faster than the 6% growth rate for ESRD in general. The Modification of Diet in Renal Disease study was a large-scale evaluation of patients with progressive CRI. It found that 65% of patients whose GFR was reduced to 80% of normal had HTN, and 95% of those whose GFR had fallen to 10% of normal (the point at which dialysis usually begins) had HTN.[3] Renal failure produces or worsens HTN by increasing extracellular fluid volume, decreasing the metabolism of vasoconstricting substances such as endothelin, and impairing the production of vasodilating mediators such as nitric oxide. In a vicious cycle, HTN worsens renal failure because pressure overload induces vascular hypertrophy and nephrosclerosis. HTN also activates growth factors leading to mesangial proliferation and glomerulosclerosis.

The Joint National Committee on HTN cites a number of nonpharmacologic interventions to reduce blood pressure. These should be instituted before or concomitant with pharmacological therapy. Weight loss reduces blood pressure in many persons who are more than 10% above ideal body weight. Drinking more than 1 ounce of alcohol per day should be eliminated since it may create resistance to antihypertensive drugs. The committee recommends smoking cessation, decreasing dietary fat intake and restricting dietary sodium to less than 2-3grams of sodium per day (because 50-90% of patients have salt-sensitive HTN).[4]

Beta-adrenergic receptor blocking drugs and thiazide diuretics form the mainstay of drug treatment of hypertension, but in hypertensive patients with CRI treatment usually begins with angiotensin-converting enzyme inhibitors (ACEIs). The first large randomized control trial evaluated the use of captopril in 409 patients with Type 1 DM, most of whom had HTN at the start of the trial. After 3 years, there was a 50% reduction in the rate of progression to an endpoint (either doubling of serum creatinine or death, kidney transplant, or initiation of hemodialysis). Patients with the worst renal disease benefited most, but curiously the mean arterial blood pressure did not fall significantly.[5] The beneficial effect of ACEI (control of both blood pressure and proteinuria) was later validated in nondiabetic patients with CRI, 80% of whom were hypertensive.[6]

In the more recent UK Prospective Diabetes Study Group trial, 1148 patients with Type 2 DM and HTN underwent strict blood pressure control with either ACEI (captopril) or beta-blocker (Atenolol). After 10 years of treatment there was a 5-7% reduction in systolic and diastolic blood pressure with either medication, and only 1% of either group had progressed to CRI.[7] These data suggest that control of blood pressure with either beta-blockade or ACEI tempers the progression of renal disease.

Data on use of calcium channel blockers (CCBs) are inconsistent. A randomized controlled trial of nifedipine versus captopril in 121 non-diabetic patients with baseline serum creatinines ranging from 1.8 to 5 showed that both treatments produced a 15% reduction in mean systolic and diastolic blood pressure and a slowing in the rate of fall in CrCL.[8] The study was too small to compare the two treatments head-to-head, and there was a 25% drop-out rate, clouding the validity of the results. Some trials suggest that CCBs decrease cardiovascular events, but other studies found an increased risk of cardiovascular morbidity or mortality, particularly in patients with Type 2 DM.[9-12] No published trial adequately addresses the effect of CCBs on the progression of renal insufficiency, but CCBs cannot be recommended as front-line therapy because they may be dangerous.[13]

In general, we know that controlling high blood pressure with ACEIs and beta-blockers retards the progression of CRI. Diuretics, used to control fluid overload in CRI, also lower blood pressure. Other antihypertensive drugs such as clonidine, labetolol, and minoxidil may also slow the deterioration of renal function. CCBs are commonly used, but we need more data before they can be unanimously recommended.

> "The differences between treatment groups in regard to serum creatinine (and proteinuria) did not become statistically significant until after 9 years of intensive treatment, suggesting that clinicians must intervene early and maintain optimal blood sugar values to slow the progression of renal insufficiency."

Strict Management of Diabetes. DM is listed as the cause of ESRD in 39% of cases. We have already noted the benefits of ACEIs on diabetic nephropathy, but tight blood sugar control also slows the progression of CRI. The situation is complicated because diabetic nephropathy may not be clinically evident in its early stages when hyperfiltration increases the GFR. Definite renal involvement (in the form of microalbuminuria) is not typically seen until 7-15 years after the onset of diabetes, and CrCl may not fall significantly until 20 years after diagnosis. By then there usually is frank proteinuria and rising blood pressure, and 50-75% of such patients progress to ESRD.

Hyperglycemia itself damages the kidney in several ways. It creates an osmotic effect leading to hyperfiltration and glomerular damage. It combines with proteins (glycation) and the glycated end-products cause vascular dysfunction, free radical production, and arteriolosclerosis. The release of cytokines by the diabetic kidney causes mesangial cell proliferation. Lowering the blood sugar lessens the complications. In the Diabetes Control and Complications Trial, 1441 patients with Type 1 DM were randomized to intensive (3 or more insulin injections/day) or conventional (2 insulin injections/day) treatment. The average follow-up was 6.5 years and, among those with preexisting mild retinopathy, intensive insulin treatment led to 43% fewer individuals with a urine albumin excretion rate of 40 mg/day and 56% fewer with a rate of 300mg/day.[14]

There is also a benefit of tight blood sugar control in patients with Type 2 DM. A study of 4209 patients with Type 2 DM and serum creatinine less than 2mg/dL, randomized to conventional or intensive blood glucose control (with oral hypoglycemic drugs and insulin if needed), found a doubling of the serum creatinine after 12 years in 3.5% of the conventional treatment group but only 0.8% of the intensive treatment group.[15] The differences between treatment groups in regard to serum creatinine (and proteinuria) did not become statistically significant until after 9 years of intensive treatment, suggesting that clinicians must intervene early and maintain optimal blood sugar values to slow the progression of renal insufficiency.

Dietary Protein Restriction. Many clinicians restrict dietary protein in patients with CRI, but the data in humans do not prove that this helps. In rats, on the other hand, there are good data. When renal mass in rats is reduced (say, by unilateral nephrectomy), the surviving glomeruli compensate by hyperfiltration. This alters glomerular wall permeability and damages glomerular architecture. Restricting dietary protein reduces hyperfiltration and the subsequent deterioration of renal function in nephrectomized rats.

In an 18-month trial of protein restriction in humans, 228 patients with CRI were randomized to a daily intake of 0.6gm of protein/kg body weight versus no protein restriction. Patients were stratified according to baseline CrCl and degree of proteinuria. In those with preexisting proteinuria, protein excretion was reduced in both the control and intervention groups, and the final level of proteinuria (2.5gm/day) was the same in both groups. During the trial, CrCl fell more slowly than before the trial in both groups, but no comparison was possible between the protein-restricted and unrestricted groups.[16]

As part of the Modification of Diet in Renal Disease study, 585 patients with baseline GFRs of 24-55 mL/min were randomized to diets containing 1.3 or 0.58 gm protein/kg body weight/day. After, 36 months there was no difference in GFR between the groups.[17] However, the authors noted an acute drop in GFR during the first 4 months of protein restriction, owing to an abrupt change in renal hemodynamics; after 4 months, the rate of decline in GFR was in fact significantly slower in the low protein group.

A meta-analysis of 1413 patients assigned to a protein-restricted or control diet showed a small benefit from protein restriction in terms of reduced proteinuria or a slower rate of decline in GFR in non-diabetic patients.[18] Meta-analyses are subject to bias, however, since published trials tend to be those with positive rather than negative results, thereby making it more likely that a difference will be demonstrated in pooled results. Furthermore, the criteria for inclusion of studies is suspect since at least one study included in the meta-analysis was listed as showing a benefit of treatment, when the original data show none.

It seems safe to say that moderate restriction of dietary protein does not unquestionably benefit patients with CRI. Given the difficulty of compliance, restricting dietary protein may simply distract clinicians and patients from other interventions of more clearly proven benefit. However, in no instance did protein restriction cause patients to lose renal function more rapidly, so it may not be harmful. A low serum albumin concentration is associated with higher mortality in ESRD, so protein restriction ought to be stopped once ESRD is imminent and inevitable.

Conclusions

CRI is an important problem because it progresses to ESRD, which has significant associated costs, morbidity, and mortality. In managing CRI, clinicians should remember that small changes in the serum creatinine may signify substantial loss of renal function, and that the 24-hour urine creatinine clearance may be more informative, particularly if combined with measurement of protein excretion.

The treatment of CRI begins with an evaluation of any recent, acute changes in renal function and an investigation of the etiology of the patient's renal disease. DM and HTN are the most prevalent primary causes or exacerbators of renal disease. Control of blood pressure—preferably with an ACEI, then with a beta-blocker, and finally with other antihypertensive drugs—can slow the loss of renal function. Strict blood sugar control in patients with DM, particularly Type 1 DM, may slow advancement of diabetic nephropathy. Dietary protein restriction, while probably not harmful, has no unequivocally demonstrated benefits for CRI (and when the disease progresses to ESRD, aggressive nutrition rather than protein restriction is indicated). ❒

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Ozone

The Good, the Bad, and the Ugly

Luanne K. Williams, PharmD, Ricky Langley, MD, MPH, and Ronald J. Howell

Environmental ozone poses risks to public health, especially in the summer months. The North Carolina Department of Health and Human Services (DHHS) is concerned about those risks. The scientific literature, including United States Environmental Protection Agency (US EPA) documents, shows that individuals with underlying lung disease are at particular risk of developing respiratory problems following exposure to the elevated levels of ozone that may be present during the summer.

Ozone is one of the criteria pollutants identified by the US EPA under the Clean Air Act of 1970. An exposure limit was set at 0.12 parts per million (ppm) average concentration over 1 hour as the primary standard *to protect the public health*, including the health of sensitive individuals. The same level was set as a secondary standard to protect public welfare, damage to crops, animals, and buildings. Since 1970, the US EPA has reviewed more than 3,000 studies; it now proposes to phase out the previous 1-hour standard and replace it with an 8-hour standard of 0.08 ppm. Compliance with the new standard should significantly decrease ozone-related emergency room and physician visits, and hospital admissions due to respiratory problems such as asthma and pneumonia. The EPA also proposes setting the secondary ozone standard at 0.08 ppm over 8 hours.

After reviewing the US EPA's Criteria Document,[1] Staff Paper[2] and other medical literature, the Occupational and Environmental Epidemiology Branch of the State Division of Public Health concurs with setting an exposure limit of 0.08 ppm over an 8-hour time interval as the new primary ozone standard. In this paper we review data supporting the proposed US EPA 8-hour standard, outline the health effects associated with exposure to ozone, and summarize precautions to minimize the risk of adverse effects from ozone exposure.

The Health Effects of Ozone

Ozone—triatomic oxygen—is a highly reactive oxidant gas formed in the atmosphere by the action of solar ultraviolet radiation on oxygen in the air. Ozone is a noxious component of the smog found in ground level atmosphere (troposphere), but in the stratosphere (approximately 10 km above the earth's surface) an ozone layer actually protects us from exposure to harmful levels of ultraviolet light. The formation of ozone is enhanced by the presence of sunlight and volatile organic compounds and nitrogen oxides, derived largely from the exhaust emissions of cars, trucks, power plants, and factories.[1,2]

The toxicology and health effects of ozone exposure are well known. It produces its health effects through a number of complex mechanisms, including reaction with fatty acids and with sulfhydryl, amino and other electron-rich molecules in the body. It can form free radicals and is thus a powerful oxidant. Exposure to elevated ozone concentrations can disrupt the barrier function of the lung, alter mucociliary bronchoalveolar clearance, the function of alveolar macrophages, and immune competence. These effects increase susceptibility to bacterial respiratory infections and lessen lung function.[1,2]

Most studies of the health effects of ozone have focused on the respiratory system. As the concentration of ozone increases, there is an increase in symptoms such as cough, nasal irritation, throat irritation, chest pain with deep inspiration, shortness of breath, and decreased exercise performance. Ozone exposure induces tachypnea, increases airways resistance, and reduces the volume of air that can be forcibly expired in one second (FEV_1) and the forced vital capacity (FVC). Ozone causes increased airways responsiveness and sensitivity to allergens.[1,2]

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Table 1. Ozone concentrations inducing a >5% decrease in FEV_1 in healthy individuals.[1,2]

Ozone concentration (ppm)	Duration of activity	Level of activity
0.08	5-6 hours	Moderate exercise
0.10	4-5 hours	Moderate exercise
0.12	3 hours	Moderate exercise
>0.16	1-3 hours	Very heavy exercise
>0.18	1-3 hours	Heavy exercise
>0.30	1-3 hours	Moderate exercise
>0.37	1-3 hours	Light exercise
>0.50	1-3 hours	Rest

Table 2. Ozone concentrations producing temporary adverse health effects in healthy individuals[1,2]

Ozone concentration (ppm)	Duration/type of activity	Health effects
0.08	6.6 hrs moderate exercise	respiratory symptoms ↑nonspecific airways responsiveness ↑lung lavage protein content and poly morphonuclear cells ↓function of lung macrophages
0.12	1-3 hrs heavy exercise	cough
0.12	8 hrs avrg/moderate exercise	moderate respiratory impairment in 50% of individuals
0.12	8 hrs avrg/moderate exercise	severe respiratory impairment in 20% of individuals
0.12	8 hrs avrg/moderate exercise	moderate/severe respiratory symptoms in 10-15% of individuals
0.16-0.18	1-3 hrs heavy exercise	shortness of breath chest pain on deep inspiration lower respiratory scores
0.18	1-3 hrs heavy exercise	↑nonspecific airways responsiveness
0.4	1-3 hours at rest	↑nonspecific airways responsiveness

Effects in Healthy Individuals. The risk of developing health effects depends on ozone concentration and duration of exposure, sensitivity of the individual, and activity at the time of exposure (exercise increases the inhalation, and thus the intrapulmonary concentration, of ozone by increasing ventilation rate, tidal volume, and inspiratory flow). The influences of duration of exposure and level of activity can be seen in Table 1.

The FEV_1 decreases by about 50 ml for every 0.1 ppm of ozone exposure. The group mean FEV_1 of healthy individuals over 8 years of age who undergo a few hours of exposure to ozone decreases significantly (>5% compared to controls). Fortunately, the decreased lung function is of short duration and reversible in healthy individuals, but it is not known whether repeated short-term exposure to ozone can permanently injure the lungs.[1,2] As shown in Table 2, exposure to 0.12 ppm (the existing 1 hour standard) for 1 to 3 hours produces adverse health effects in healthy individuals, and exposure to 0.08 ppm (the proposed 8 hour standard) for 6.6 hours causes adverse health effects in healthy individuals.

Effects in Sensitive Individuals. Sensitive individuals have a greater risk of developing adverse respiratory effects—either because of underlying physiological abnormalities or because of a higher level of exposure due to outdoor work activities. The EPA defines four sensitive groups: children, adults who are active outdoors, people with respiratory diseases such as asthma, and people with unusual susceptibility to ozone (5-20% of healthy test subjects).[1,2]

Both sensitive and healthy individuals show similar health effects from ozone exposure, but sensitive individuals develop responses at lower ozone concentrations or after

Table 3. Locations where ozone pollution has been associated with increased hospital visits and admissions

Locations	Hospital visits and admissions
Northeastern US	10-20% increase in hospital respiratory visits and admissions[3]
Ontario, Canada	Increased hospital and emergency department visits[4]
New Jersey; Mexico City	Increased frequency of hospital visits for asthma[4]
New York	Increased frequency of hospital admissions for respiratory causes[4]
St. Paul, MN; Birmingham, AL	Increased hospital admissions for pneumonia[4]

Table 4. Average peak ozone concentrations from June through August 1998 [6-8]

	Ozone concentrations reported in NC metropolitan areas (ppm)			
Urban area	Mean-1hr (2-6 pm)	Maximum-1hr (2-6 pm)	Mean-8hr (11am–7pm)	Maximum-8hr (11am–7pm)
Charlotte	0.069	0.140	0.066	0.115
Raleigh	0.068	0.132	0.066	0.119
Durham	0.066	0.130	0.063	0.102
Greensboro	0.065	0.122	0.062	0.102
Winston-Salem	0.063	0.120	0.061	0.098
Fayetteville	0.066	0.112	0.064	0.104

Table 5. Number of calendar days in 1998 in which the US EPA 1-hour and 8-hour ozone standards were exceeded[6]

	Number of days in June-August exceeding standards	
Urban Area	0.12 ppm (1-hour standard)	0.08 ppm (8-hour standard)
Charlotte	3	32
Raleigh	1	24
Durham	1	15
Greensboro	0	11
Winston-Salem	0	10
Fayetteville	0	15

shorter exposures. In some cases, effects may be more pronounced in sensitive individuals, but these individuals rarely notice respiratory effects from exposure to less than 0.06 ppm for 8 hours.[2] The risk of developing adverse respiratory effects is much higher in sensitive individuals exposed to an 8-hour ozone concentration more than 0.10 ppm. Ozone levels in many North Carolina urban areas are high enough to produce adverse health effects in sensitive individuals.

Persons with underlying pulmonary disease are at high risk of developing respiratory problems and may require medical attention after ozone exposure. Because children are more likely to exercise outdoors than adults, and because 40% of asthma cases occur in childhood, a high percentage of children report symptoms after ozone exposure. Ozone air pollution has been associated with increased hospital visits for asthma flares, pneumonia, and other respiratory diseases in the United States, Canada, and Mexico as shown in Table 3.[3,4] The exposure of one million persons to ambient ozone concentrations of 0.100 ppm will produce 1-3 hospitalizations from respiratory illness.[2]

Ground Level Ozone Concentrations in North Carolina

Ambient levels of ozone vary by region, time of day, the presence of ozone-forming compounds, and weather conditions. Estimated summer daytime levels in the United States average 0.025-0.045 ppm over 8 hours.[5] According to the NC Division of Air Quality, ambient ozone levels in this state, June through August (when temperatures and thus ozone concentrations are highest), are usually lower in the early morning and peak between 2:00 and 6:00 pm EDT. In North Carolina mountain and coastal areas, peak ozone concentrations often occur after 7:00 pm, and there is less difference between daily lows and highs. This is due to mountain breezes blowing steadily upslope by day and downslope at night, and sea breezes blowing steadily inland by day and out to the sea at night.[6]

Ozone levels tend to be highest in urban areas such as Charlotte, Raleigh, Durham, Greensboro, Winston-Salem, and Fayetteville, and in the Great Smoky Mountains. Table 4 gives the mean and maximum 1-hour and 8-hour average ozone concentrations reported during the hottest time of the day, June through August 1998. The number of calendar days in which the US EPA 1-hour standard of 0.12 ppm and 8-hour standard of 0.08 ppm were exceeded in major North Carolina cities is shown in Table 5. These levels are high enough to cause adverse health effects even in healthy individuals.

Can Ozone Be a Problem Inside Buildings?

Most ozone monitoring data focus largely on outdoor ozone concentrations. However, there is some information on indoor concentrations. Indoor ozone sources, such as ozone-generating air cleaners, can generate ozone concentrations as high as 0.12 to 0.800 ppm,[9] which are 2.4-16 times the Food and Drug Administration's standard of 0.05 ppm for indoor medical devices and well above levels that pose potential health hazards. Because of health concerns, the US EPA, Health Canada, and several state health departments (including North Carolina's) have issued warnings about such air cleaners. A complete summary on the ozone generator issue can be found in the US EPA document entitled, *Ozone Generators That Are Sold As Air Cleaners* (available at www.epa.gov/iaq/pubs/ozonegen.html).

Ozone-generating air cleaners can produce significant ozone concentrations, but most indoor ozone comes from outdoors. Indoor ozone concentrations vary from <10 to 80% of outdoor ozone concentrations.[1] This variability is due to a number of factors: air infiltration or exchange rates, interior air circulation, interior surface composition (rugs, draperies, furniture, etc.), and reaction with indoor air compounds. Based on reported ratios of indoor to outdoor ozone, it seems likely that indoor ozone exposure may sometimes be significant. These findings are of particular concern to susceptible populations occupying urban buildings with no air-conditioning and high intakes of outside air. However, we want to stress that when outdoor ozone levels are elevated, it is generally safer to be indoors (especially in air-conditioned buildings) as long as there is no indoor ozone source.

Getting Information about Local Ozone Levels

In North Carolina, the Division of Air Quality (DAQ) in the Department of Environment and Natural Resources measures ozone concentrations from April through October at 43 monitoring sites throughout the state. During the season, the DAQ forecasts ozone levels for each upcoming day using meteorological and non-meteorological data. If the level is predicted to exceed the 8-hour ozone standard of 0.08 ppm, specific state agencies are notified. The forecasts, released at 3:00 pm in order to provide sufficient time for the public to take necessary precautions, are reported to the Associated Press, and to television and radio stations and newspapers in the Research Triangle and Charlotte areas. The Forsyth County Environmental Affairs Department informs the media in the Triad. The DAQ forecast can be found on the Internet (http://daq.state.nc.us); general information about ozone can be found at the US EPA web address (http://www.epw.gov/airnow).

The ozone forecast reports one of five color codes (Green, Yellow, Orange, Red, Purple) for the predicted ozone concentrations. These color codes correspond to a US EPA derived Air Quality Index (AQI), and health advice associated with that code.[10] The higher the AQI, the greater the health concern. Table 6 lists these codes and the summarized health effects and advice for each code.

Can We Reduce Ozone Levels?

Ground level ozone is produced when ozone precursors like volatile organic chemicals and nitrogen oxides react with sunlight. Coal-powered plants, automobiles and other vehicles are major sources of these ozone precursor compounds. We can decrease ozone levels by driving less, by carpooling, by having our cars well-tuned, by refueling only after 6 pm, by conserving electricity, by minimizing spills of chemicals such as gasoline and by tightly sealing containers holding volatile organic chemicals.

Summary

Sensitive individuals are at risk of adverse health effects from exposure to even modest levels of ozone. Such individuals are likely to develop respiratory symptoms and are more likely to be hospitalized when exposed to ozone at currently accepted levels. A review of scientific documents regarding the health effects of ozone has led the DHHS to agree with the EPA that the primary ambient air standard for ozone should be changed from 0.12 ppm (1-hour average) to 0.08 ppm (8-hour average). Achieving the proposed 0.08 ppm standard should decrease physician visits, hospitalization, and use of respiratory medications. In addition, because very susceptible healthy individuals may experience adverse health effects of the current standard, it is clear that the current standard provides little or no margin of safety, particularly for sensitive individuals.

In order to avoid exposure to unhealthy levels of ozone,

Table 6. US EPA color codes corresponding to ground level ozone concentrations[2†]

Air quality category	Ozone (ppm/8-hr)	AQI*	Color code	Health effects and advice
Good	0.0-0.064	0-50	GREEN	No adverse health effects expected
Moderate	0.065-0.084	51-100	YELLOW	In unusually sensitive individuals: - possible cough, painful breathing - limit prolonged outdoor exposure - minimize outdoor exposure from 2:00-6:00 pm
Unhealthy for sensitive persons	0.085-0.104	101-150	ORANGE	In sensitive individuals: - possible cough, painful breathing, diminished lung function - limit prolonged outdoor exposure - minimize outdoor exposure from 2:00 to 6:00 pm
Unhealthy	0.105-0.124	151-200	RED	In sensitive individuals - probable cough, painful breathing, diminished lung function - avoid prolonged outdoor exposure - minimize outdoor exposure 2:00 to 6:00 pm In healthy individuals - possible cough, painful breathing, diminished lung function - limit prolonged outdoor exposure - minimize outdoor exposure from 2:00 to 6:00 pm
Very unhealthy	0.125+	201-300	PURPLE	Sensitive and healthy individuals - cough; painful, impaired breathing, diminished lung function Sensitive individuals - avoid outdoor activity Healthy individuals - limit outdoor exertion - avoid outdoor exposure 2:00 to 6:00 pm

† Minor modifications from original reference
*Air Quality Index

people should take precautions to minimize exposure from 2:00 to 6:00 pm on days when ozone levels are high. This is especially so for children, adults who are active outdoors, those with respiratory disease such as asthma, and people with unusual susceptibility to ozone. ❐

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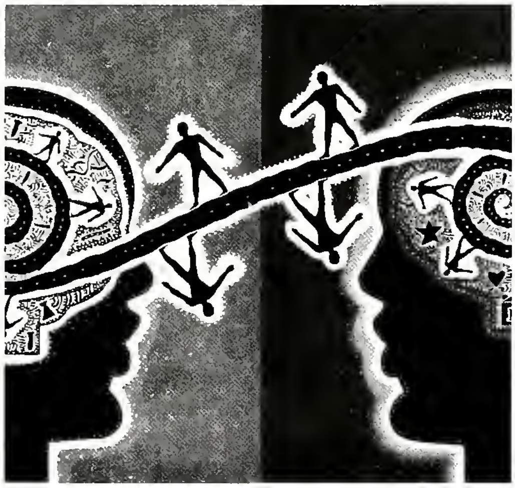

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My Father, My Life, and Chlorpromazine

Moira Frierson Artigues, MD

This story begins before my birth. In the late 1950s, my father graduated from the Medical University of South Carolina and began a residency in psychiatry, first in Newport News, Virginia and later at the Menninger Clinic in Topeka, Kansas. In March 1964, in his last year of residency, he was killed in a motor vehicle accident. I was a year old. My mother, two older sisters and I left Topeka for Charleston, South Carolina, my mother's home. When my mother remarried, she threw away most of the pictures of my father and the books that had belonged to him. Among his few remaining possessions were a *Merck Manual*, circa 1961, and *Anomalies of Modern Medicine* —a large blue book of photographs of disfiguring illnesses, simultaneously repellant and captivating. I gave these two books an extraordinary amount of attention. I was intensely curious about my father—who had he been?

When I decided to go to medical school, my thoughts began to turn more regularly to my deceased father. Every day I walked the same sidewalks at the Medical University that he had walked 30 years before. Once in the medical library, I looked into the Index Medicus and found that he had published two case reports, in 1959 and 1961. These dealt with the use of the then-new major tranquilizers, chlorpromazine and prochlorperazine. Reading what he had written seemed like hearing his voice for the first time. I had already decided to train in psychiatry, but reading these case reports made it apparent how different would be the psychiatry that I would practice compared to my father's.

The Treatment of Schizophrenia

During my training at Duke, the residents were assigned the task of teaching one another about different aspects of schizophrenia. I chose the history of treatment for schizophrenia. In reviewing my father's edition of the *Merck Manual*, I found, to my surprise, that in 1961 psychotherapy, electroconvulsive therapy, and insulin shock were the sole forms of somatic treatment for psychosis. Chlorpromazine was mentioned as a tranquilizing agent of limited usefulness. I was astonished: a medication that can treat psychosis was used only as a tranquilizer, while less reliable, laborious, and dangerous treatments were preferred. Only after 15 years of clinical use was chlorpromazine recognized as having anti-psychotic activity. In fact, this recognition was a triumph for biological psychiatry, showing that alteration of brain chemistry could produce changes in thoughts and behavior.

Since the time of Freud, biological and psychoanalytic psychiatrists had occupied opposing camps, but over the last forty years advances in psychopharmacology have led many psychiatrists to cast aside the use of psychotherapy and psychoanalysis. The success of medication has led to a simplistic view of treatment, a "dumbing-down" of psychiatry. Psychiatry residencies today teach only a bare minimum of psychoanalysis and the techniques of psychotherapy, even though the enormous impact of human relationships on the functioning—not to mention the structure—of the human brain is well-supported by research findings.

Instead of viewing biological and psychoanalytic models as opposed to one another, I believe that psychiatrists today could improve their treatments by using both medications and psychotherapy. This would also integrate the factors that make psychiatry a fascinating field: hard science alongside thought and behavior. Patients and psychiatrists would best be served by a view that encompasses all that makes psychiatry so rewarding.

Chlorpromazine Again

At his death, Frederick Hine, MD, a generous Professor of Psychiatry at Duke, left his books to the Medical Center. One day, I saw a sign in the library that read, "Free Books in Basement." In piles on the floor lay Dr. Hine's books,

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hundreds of books, old and new, on every imaginable subject in psychiatry. I picked up as many as I could carry and was about to leave with my arms full when I saw the title *Chlorpromazine and Mental Health.*

This little red book documented the proceedings of a 1955 conference held in Philadelphia, at which Smith, Kline and French introduced chlorpromazine following its synthesis by Rhone-Poulenc in France in 1950. Jean Delay and Francis Deniker, psychiatrists at St. Anne's Hospital in Paris, used the drug to treat mania, schizophrenia, and other neuropsychiatric illnesses. They called it a "neuroleptic" from the Greek word *leptikos*, meaning "accepting" or "assimilative."[1] Francis Boyer, President of Smith, Kline and French, hailed the "new climate surrounding the treatment of the mentally ill," as demonstrated by a conference "centered around a new drug and sponsored by a pharmaceutical house"—a combination unheard of in psychiatry before this.[2]

"The more I learned about the practice of psychiatry in my father's time, the more my admiration for him grew. It took courage to choose psychiatry as one's profession."

Again, comparisons with my father's era were inevitable. I was training at a time when weekly luncheons for residents were sponsored by pharmaceutical companies hoping to capture the budding doctors' attention. There was other "free stuff": coffee mugs, pens, free dinners, even books—such as the two-volume, $200 *Comprehensive Textbook of Psychiatry* given to me by a representative of the Glaxo Wellcome Corporation. My father never enjoyed such "perks" (or bribes). It is not hard to find the reasons drug companies have permeated training in psychiatry to such a phenomenal degree. In 1997, Prozac, the best-selling psychotropic drug in the world, generated revenues of $2.7 billion worldwide and $1 billion in the United States. The "new climate" that Mr. Boyer noted in 1950 has become the prevailing weather condition.

In 1954, chlorpromazine was introduced into clinical use in the United States. It was to be used for "Tension and anxiety states, mild to severe agitation, and hypomanic and manic behavior, as well as. . . patients with delusions, hallucinations, and various obsessive-compulsive-phobic conditions. It was also given to patients with epilepsy and paralysis agitans."[3] The need was real. The Commission on Chronic Illness reported that 1.2 million patients had been admitted to mental hospitals in 1950, and at any given time, there were between 700,000 and 800,000 patients behind the walls.[4] Mental hospitals were remote from academic centers, and psychiatry suffered from this separation. Opportunities for research were lost and, importantly, psychiatry was perceived as an esoteric, inaccessible, "non-medical" specialty. This led to excesses. In 1955, Dr. Vernon Kinross-Wright wrote that chlorpormazine had produced "Improvement, and often cure . . . in practically every type of mental illness."[5] Dr. Kinross-Wright's over-enthusiastic endorsement of chlorpromazine sounds almost desperate. The reasons for this are not hard to imagine: the isolation that psychiatrists of the day must have felt, and the lack of effective treatment for their desperately ill patients.

The Treatment of Mental Illness

In 1950, most institutionalized patients had been diagnosed with schizophrenia, which affects about 1% of the general population. The treatments such patients were subjected to then and during the preceding 100 years included gyration in swivel chairs to the point of nausea and vomiting; apomorphine injections; bloodletting; etherization; oral administration of camphor, digitalis, hemlock, quinine, opium, bromides, cannabis, and mescal; starvation; high-fat diet; bowel lavage; tooth extraction; production of abscesses; insulin shock; psychosurgery; massage; prolonged sleep induction; beating; restraint (including "Rush's Tranquilizer," a restraining chair invented by the reformer Benjamin Rush in the mid-nineteenth century); seclusion; and bed rest.[6] Hydrotherapy ranged from Freud's accounts of standing with his patients in waist-deep water to wrapping patients tightly in damp sheets for hours at a time. There are horrific accounts of the "icepick treatment," the brutal practice of lobotomy, in which a metal probe was (literally) hammered through the medial lacrimal duct of an awake patient in order to destroy the frontal lobe of the brain. There is a legend in my family that the janitor in our Topeka apartment building had had a lobotomy and sat like a zombie in a utility closet for much of the day. The more I learned about the practice of psychiatry in my father's time, the more my admiration for him grew. It took courage to choose psychiatry as one's profession.

Chlorpromazine was viewed as a godsend by the struggling clinicians of the 1950s. Dr. Mortimer Gross offered a sketch of the life in a "State Hospital Regressed Ward." "The schizophrenic patients we are dealing with have been on this ward an average of 8 years, and in a state hospital an average of 12 years. The degree of their untidiness varies, from a few who wet the bed at night only occasionally. . . to those few who are untidy all the time, drol [sic] saliva over their clothes, and allow accumulation of nasal discharges. . . . As a group, the patients present a rather chaotic picture. . . the idleness, the empty, meaningless activity, the constant walking back and forth and milling about [is] very prominent. Also outstanding is the absence of any apparent group feeling; one senses immediately that there are 160 men together in the cottage, but with little sense of community. . . . Sometimes a patient who is constantly shouting, or one who runs about incessantly, affects the others and seems to stimulate a general restlessness. It is at these times that fights break out, and there seems to be a vicious cycle leading to decrease of morale, and a decrease in patience on the part of the attendants. On the other hand, 'bath morning' is always calm, the sedative effect of the bath exerting a quieting effect with a resulting benign cycle. Thus the patients behave as a group, even without awareness of this feeling." For Dr. Gross the "aim of therapy" was "better hospital adaptation," because "it is presumed that these patients will remain hospitalized."[7]

One is struck by how seldom patients were discharged from the hospital, even when chlorpromazine induced dramatic improvement. Most reports of its effect had a common format: assertion of benefits, then patient anecdotes to support the assertions. One such describes a 29-year-old woman whose pre-chlorpromazine conduct was replete with "self-inflicted injuries, temper tantrums, sullenness, and antagonistic behavior" toward staff and other patients. She had an immediate and remarkable response to the drug after which she showed "considerable initiative in performing numerous errands with little or no direction, in helping the cottage physicians with the preparation of patients for injections, and so on. She is pleasant, cooperative, capable, and has become a useful member of the institutional society."[8] Another patient was reportedly restored to pre-morbid functioning after having been "hallucinating both auditorily and visually"; she was "delighted" to visit home for the first time in fifteen years and was "apparently quite content with the thought that she would be permitted future visits at home."[8] Of 750 patients studied at the Manhattan State Hospital in 1954, 475 were said to have improved with the drug, but only 48 were discharged.[9] What a contrast with today's emphasis on discharging patients as rapidly as possible!

"In 1954-55, chlorpromazine was used to treat problem behavior, not psychosis. For example, subjects for one study in 1955 were obtained by asking hospital staff to name their 'fifty most troublesome patients.'"

Who Chose Psychiatry and Why?

Why did my father choose psychiatry? It is tempting to depict him as a martyr, but I doubt he chose his profession out of a sense of duty. More likely, he was interested in psychoanalysis—as I was when I made my choice. In the 1950s, psychoanalysis was the treatment for most mental illnesses, including schizophrenia. Contemporary textbooks of psychiatry posited that schizophrenia arose as a defensive posture on the part of the patient, a schizophrenic solution of a psychological problem. Psychoanalysis was in vogue, a luxury available to the middle-upper classes and those in psychiatric training, like my father. The occultist nature of psychoanalysis and a pop-culture hunger for the secrets of mental illness were fodder for a number of popular books and films. In the 1964 novel *I Never Promised You a Rose Garden*, the protagonist experiences a complete remission of schizophrenia after long-term hospitalization, hydrotherapy (wrapping in damp sheets) when needed, and intensive psychotherapy. Her cure comes when she recognizes that psychosis originates within her, creating a "safe place" where she can escape the intolerable pain of life in the world.[10] She received no chlorpromazine, an omission that would today be greeted with derision and scorn by psychiatrists—perhaps even be grounds for a lawsuit, as in the case of *Osheroff v. Chestnut Lodge*, 1985, 490 A.2d 720 [Md. App. 1985] where the plaintiff was awarded $250,000 because the psychiatric hospital failed to use psychotropic medications.

In 1954-55, chlorpromazine was used to treat problem behavior, not psychosis. For example, subjects for one study in 1955 were obtained by asking hospital staff to name their "fifty most troublesome patients."[1] Drug treatment was considered efficacious if there was less need for physical restraint and fewer episodes of hydro- or electroconvulsive therapy, but investigators lamented the lack of concrete, objective measures of the efficacy. Outcomes of treatment were classified with vague, subjective indices into "Good," "Fair," "Poor," "No change," or "Worse." Two things seem clear: (1) there was an overall lack of scientific research methodology, and (2) investigators did not realize the need to monitor psychotic symptoms, as is standard practice today. In 1954, N. William Winkelman provided an encapsulated summary of the general philosophy of psychiatric treatment of the time: "Although [chlorpromazine] should never be given as a substitute for analytically oriented psychotherapy, it must be considered as a true therapeutic agent with definitive indications. The drug is especially remarkable in that it can reduce severe anxiety, diminish phobias and obsessions, reverse or modify a paranoid psychosis, quiet manic or extremely agitated patients, and change the hostile, agitated, senile patient into a quiet, easily managed patient."[4]

The Nature of Psychosis

The idea that psychosis resulted from altered neurotransmitter function had not been formulated when chlorpromazine was introduced. Only in 1964 was chlorpromazine definitively shown to have anti-psychotic action.[12] The idea that therapeutic drugs could change a person's thoughts is emblematic of the tension between the psychoanalytic and the biological camps in psychiatry. This struggle had begun with the discovery that infection with *Treponema pallidum* could produce mental illness (neurosyphilis). The debate was fueled by the later discoveries that thyroid dysfunction and vitamin deficiency could alter mental processes. Unfortunately, schizophrenia resisted easy definition as an inheritable disease or as an infectious process. Post-mortem studies of schizophrenic brains revealed so many minute abnormalities that such efforts were soon abandoned. We are left with perplexing data showing that people who develop schizophrenia tend to be born at certain months of the year, and the disorder tends to cluster in families, but we are no closer to understanding the etiology.

The tension between biological and psychoanalytic psychiatry can be viewed as a "macrobrain versus microbrain" problem, what Adolf Meyer called the "neurologizing tautology."[13] Biological psychiatry concerns itself with neuroanatomy and neurochemistry, while psychoanalytic psychiatry focuses on the meaning of thought and behavior. These are just two ways to look at the same phenomena. Consider the experiments that provided orphaned infant monkeys with terrycloth or wire "mothers," or those depriving sensory input by covering an eye during brain development. Brain structure and function are both changed as the direct result of experience. A more recent study concludes that cognitive-behavioral therapy changes the brain of subjects with obsessive-compulsive disorder.[14] Experience changes neuroanatomic substrates, and we can sometimes actually measure those changes.

"The tension between biological and psychoanalytic psychiatry can be viewed as a 'macrobrain versus microbrain' problem, what Adolf Meyer called the 'neurologizing tautology.'"

To bring the matter full circle, the recent studies of Hogarty et al have shown that psychotherapy (plus medication) can improve social adjustment in schizophrenia.[15] This is a complete reversal of recommendations in 1954-55, when chlorpromazine was the adjunct to psychotherapy. Hogarty's study is unusual because psychotherapy as treatment for schizophrenia has been ignored in recent years. The psychodynamic and psychosocial theories of schizophrenia are currently disregarded, but without good reason. Modern theories hold that schizophrenia is a neurodevelopmental malady, yet there are no studies eliminating environmental forces. Apparently modern psychiatrists are biased against a dynamic viewpoint. What is the root of this animosity? Leon Eisenberg postulated that, having been "so long pilloried by our medical and surgical colleagues as witch doctors and wooly-minded thinkers," psychiatrists are "tempted to seek professional respectability by adhering to a reductionistic model of mental disorders"; a shift in psychiatry from a "brainless" focus to a "mindless" one.[16]

The rejection of psychoanalysis may well arise in the human desire for concrete tenets and bases for action. The human resistance against the subjective shows itself in those who advocated for biological psychiatry in the 1950s. In the 1955 study entitled "Bacteriological studies on the etiology and chlorpromazine treatment of schizophrenia and related mental disorders," for example, Dr. E. C. Rosenow proposes that infection by a neurotropic streptococcus causes schizophrenia. He concludes, "How contrary to current psychiatric tenets is the concept that schizophrenia and related mental disorders can possibly be due to an infectious process, but the results of bacteriological studies by the special methods used indicate that such is nevertheless the case." He cites 11 references, all authored by himself.[17]

Mitchell Wilson suggested that the fluid boundary between psychoanalytically normal and disordered lends an air of the unscientific to psychiatry.[18] It also breeds defensiveness. L.J. Meduna, in his 1954 Presidential Address to the Annual Convention and Scientific Meeting of the Society of Biological Psychiatry, complained that "if you dream of a church steeple, you want to have a penis; if you dream of a telegraph pole, you also dream of a penis. But no patient who has dreamt of a penis is ever told that she wants to go to church or send a telegram. . . . Our flag is a flag of revolution upon which I should like to write the rebellious, the defiant, motto: 'A telegraph pole is a telegraph pole.'"[19]

The Lamp of History

In a way, my research into the history of chlorpromazine helped me to get to know my father. I see him as a young man intrigued by a fantasy of idealized psychiatry, amalgamated from images in the popular media. Interested in personal growth and a hope that the mysteries of the psyche might be unveiled, he found an analyst. I see him as an inquisitive and curious person, training at a time when amazing discoveries about psychopharmacology lay just around the corner. He undertook the care of very difficult patients without the tools available today. I see him as a man of moral courage and generosity, familiar with the psychoanalytic and the biological aspects of his profession, undergoing his personal analysis at the same time he was writing case reports about the new psychotropic drugs. He recognized that his chosen profession was at a watershed in its history. The future must have looked exciting. I only wish we could talk to him about the marvel of psychopharmacological advances; he could wax nostalgic about the good old days. ❐

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Assuring Access to Dental Care for Low-Income Families in North Carolina

The NC Institute of Medicine Task Force Study

Pam Silberman, JD, DrPH, Dennis A. Wicker, JD, Sherwood H. Smith, Jr., JD, Gordon H. DeFriese, PhD

Dental disease often goes unrecognized as a public health problem. Still, tooth decay is one of the most frequently encountered diseases of school children, found four times more often than asthma.[1] Common as caries is, few children living in poverty get adequate dental care. In North Carolina, for example, only 12% of Medicaid-eligible children aged 1-5, 27% of those aged 6-14, and 19% of those aged 15-20 visited a dentist in 1998. Access to dental care is a problem for low-income adults, too. Only 19% of North Carolina's Medicaid-eligible adults aged 21-64, and 16% of those aged 65 or older saw a dentist last year. Failure to prevent dental disease can mean pain, inability to eat, a swollen face, compromised nutrition, dysfunctional speech, and days missed from school or work.[2] Lack of access to dental services leads to otherwise preventable emergency room visits and hospitalizations. In 1997, the NC Medicaid program paid $1,686,565 for 62,000 (preventable) emergency dental visits.

There are a number of reasons why Medicaid recipients do not use dental services:

(1) Only a small number of dentists participate in the Medicaid program (16% of North Carolina dentists received payments over $10,000 in 1998[3]). North Carolina ranked 44th out of 50 states in the rate of actively participating dentists.

(2) There is an overall shortage of dental professionals. Compared to other states, North Carolina ranks 47th in the ratio of dentists to population served[4] (38 dentists/100,000 people compared to the national ratio of 60/100,000).

(3) There is a maldistribution of dentists who, like other health professionals, gravitate to urban communities—but not usually to low-income parts of urban counties. Four North Carolina counties have no dentists in practice, and another 36 have no dentists offering services to Medicaid recipients. This means that many communities have too few dentists to serve the insured population, much less the low-income Medicaid or uninsured populations.

The problem low-income families have in finding access to dental care is not unique to North Carolina, nor is the problem new to the state. Media attention led to a 1998 legislative mandate that the NC Department of Health and Human Services (DHHS) study the issue and recommend ways to increase participation by dentists and to improve the provision of preventive services to Medicaid patients. The DHHS then asked the NC Institute of Medicine to convene a task force of experts to study this problem and develop a set of recommendations.

The Task Force on Dental Care Access

The NC Institute of Medicine's statewide task force was chaired by Lieutenant Governor Dennis A.Wicker, with Sherwood Smith, Jr., Chairman of Carolina Power & Light Company, as Vice-Chair. Members of the Task Force included dentists, dental hygienists and dental assistants from professional organizations, dentists (from private practice and from clinics serving low-income populations), physicians, and the general public. Funds supporting the work of the Task Force were provided by grants from The Duke Endowment and the Kate B. Reynolds Charitable Trust.

There were four meetings of the full Task Force and frequent subcommittee meetings to consider the issues and to make recommendations. The Task Force heard testimony about the extent of dental decay in the state, the problems

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encountered by private practitioners working with Medicaid clients, the number and distribution of dental health professionals, the training and licensure of dentists and dental hygienists, and the supervision of hygienists by dentists. Recommendations of the subcommittees were brought to the full Task Force for deliberation and a formal vote. The final report of the Task Force went through several revisions before it was approved and submitted to the Board of Directors of the North Carolina Institute of Medicine.

Findings of the Task Force

The Task Force identified a number of reasons why low-income families do not use dental services. The most important of these is the low rate of dentist participation in the Medicaid program. Dentists, in turn, say that they don't want to treat Medicaid patients primarily because the rate of reimbursement is so low. On average, the NC Medicaid program pays dentists 62% of their usual, customary, and reasonable charges (UCR) for the 44 most common dental procedures, and 42% of UCR for all other procedures. Yet the average cost of operating a dental practice is more than 60% of total revenues.[5] This means that many dentists cannot cover their overhead costs, let alone earn a living, treating Medicaid patients.

> "Dental decay affects 44% of children - much more than asthma (11%), hayfever (8%), or chronic bronchitis (4%). In the last 30-40 years there has been significant progress in preventing dental decay, but North Carolina's youngest children have not benefited as they should have."

High rates of cancellation and "failure-to-show" for appointments also make dentists unwilling to treat Medicaid patients.[6] According to the American Dental Association, 30% of Medicaid patients nationwide fail to keep their appointments.[7] Practitioners in North Carolina echoed this in testimony before the Task Force.

There is a general shortage of dentists in the state, so dentists are busy enough without taking on Medicaid patients. Currently, 3,037 dentists practice in North Carolina, 81% of them in general dentistry. North Carolina's only dental school (at UNC-Chapel Hill) has a class size of about 75. Each year about 50 UNC-CH graduates take the North Carolina licensure examination and enter practice in the state. Since 1995, North Carolina has had an average net gain of about 44 practicing dentists per year, a 1.5% annual increase that is just enough to keep up with the state's rate of population growth. The Task Force heard testimony that the state's current licensing procedures (particularly the failure of the State Board of Dental Examiners to recognize or participate in a regional examination procedure for licensing new dental graduates or accepting the credentials of those who have practiced elsewhere) make it difficult for out-of-state dentists to relocate to North Carolina. Overall, there is little present prospect of increasing the supply of dentists in the state.

The shortage of dentists is compounded by their maldistribution. The NC Office of Research, Demonstrations and Rural Health Development estimates that 79 of the state's 100 counties qualify as federally recognized dental health professional shortage areas (that is, they have less than one full-time equivalent dentist for every 5,000 inhabitants). The shortage of practicing dentists means that many communities need to recruit dentists who will work in underserved areas or at public health and community clinics for underserved populations.

Many barriers impede access of low-income families to dentists, but these barriers are especially troublesome for young children with untreated dental disease. Dental decay affects 44% of children – much more than asthma (11%), hayfever (8%), or chronic bronchitis (4%).[1] In the last 30-40 years there has been significant progress in preventing dental decay, but North Carolina's youngest children have not benefited as they should have. More than 31,000 children in this state – 36% of all those entering kindergarten — have or have had dental caries, and 25% have untreated dental disease. Tooth decay is not evenly distributed – 30% of kindergarten students have 95% of the tooth decay.

Early childhood caries is much more prevalent in low-income populations and in rural communities without fluoridated water. Caries can lead to severe oral and systemic health consequences as these children grow older. Left untreated dental disease in young children can necessitate later dental care under general anesthesia in the hospital, greatly increasing the cost of treating a preventable disease. Pediatric dentists are specially trained to provide such hospital care, but we have only 47 pediatric dentists actively practicing in North Carolina. General dentists do treat children as outpatients, but they are often unwilling to treat very young children. Few general dentists have hospital privileges that would allow them to provide dental treatment under general anesthesia.

Young children are not the only ones who have problems accessing dental services. Persons who are homebound or living in institutions or group homes also have special problems. A 1991 national study found that only 30% of residential facilities could obtain needed dental care for their residents.[8] Dental care is a special problem for those who suffer from dementia, mental illness, and other disabilities—and for the elderly. The increasing demand for dental care for older adults is the result of people living longer and, because of water fluoridation and other dental advances, keeping their teeth throughout their lifetime

Even if we had enough dentists willing to treat Medicaid patients, there are other barriers to dental care access. Low-income and Medicaid-eligible working populations often find it difficult to take time off from work to see a dentist. A lack of available child or elder care keeps some families from obtaining dental services. The absence of personal or public transportation is another barrier.[9] It is also true that a failure to value optimal health often leads the low-income population in North Carolina to make dental services a low priority. Many are simply unaware of the importance of good dental health; others wait until they are in pain before seeking help.[10] Together, these barriers make it unlikely that all Medicaid recipients would seek dental services even if there were an adequate supply of participating dentists in the Medicaid program.

Recommendations

When the Task Force finished its work in April, 1999, it recognized the need for a multifaceted approach to improving access to dental care. The Final Report[11] included 23 recommendations addressing the following general areas:

- Increasing dentist participation in the Medicaid program.
- Increasing the supply of dentists and dental hygienists in North Carolina, with a particular focus on recruiting dental professionals to practice in underserved areas and to treat underserved populations.
- Increasing the number of pediatric dentists practicing in North Carolina and expanding the provision of preventive dental services to young children.
- Training dental professionals to treat patients with special needs and designing programs to expand access to dental services for these populations.
- Educating Medicaid recipients about the importance of care, and developing programs to remove non-financial barriers to the use of dental services.

The Task Force outlined ways to improve access to dentists in both public and private clinics. For example, the Task Force recommended that the state spend $1 million each year to expand the public health safety net providing dental care to low-income populations. The bulk of these funds would be used for seed grants to help local communities obtain private funds to establish or expand community dental clinics, and to recruit dentists to practice in these clinics.

As helpful as community or public health dental clinics are for low-income communities, though, they are not the sole answer. The state also needs to increase the number of private dentists accepting Medicaid patients. Therefore, the Task Force's top priority was an increase in Medicaid payments to dentists. A 1996 survey found that 56% of NC dentists would be willing to see Medicaid patients if they were reimbursed at 80% of UCR.[6] The Task Force estimated that it would cost the state approximately $9 million dollars to do this, plus another $17.4 million from the federal and $1.5 million from county governments. Should such a recommendation be enacted, the NC Dental Society has agreed to sponsor an outreach campaign encouraging dentists in private practice to treat low-income patients.

> "The most significant improvements in dental health over the last 20 years have come from preventive health measures such as water flouridation, the application of dental sealants, and the school-based preventive dentistry program."

The most significant improvements in dental health over the last 20 years have come from preventive health measures such as water flouridation, the application of dental sealants, and the school-based preventive dentistry program. The school-based preventive dentistry program has reduced the prevalence of dental decay in the permanent teeth of North Carolina schoolchildren by half. In order to extend this track record of success, the Task Force recommended that (1) the Division of Medical Assistance pay physicians, nurse practitioners and physician's assistants to apply dental varnishes to children between the ages of nine and 36 months; and (2) the General Assembly fund a program that would utilize hygienists to provide preventive dental services in preschool settings, such as day care centers, Smart Start and Head Start programs. When fully funded, this program would use about $2.2 million per year to prevent oral disease in preschool-aged children.

The Task Force recommended that North Carolina make it easier for out-of-state dentists to practice here; that North Carolina increase the number of pediatric dental residency training slots and training sites; that we support the development of comprehensive care programs for North Carolina's special-care and difficult-to-serve populations; and that we coordinate dental care services for Medicaid recipients. The goal is to improve patient adherence to recommended preventive care services, and to help low-income families and people with special health care needs overcome nonfinancial barriers to dental care.

Summary

Following publication of the Task Force's recommendations for improving dental care access among low-income populations, North Carolina has taken several steps forward. The Division of Medical Assistance and the NC Dental Society are forming an advisory committee (comprising Medicaid patients, providers, and representatives from all elements of organized dentistry in the state) to review dental coverage and reimbursement rates. Using existing state funds, the NC Office of Research, Demonstrations and Rural Health Development has recruited 15 additional dentists and 1 dental hygienist to practice in community facilities serving low-income and uninsured patients. In 1999, the NC General Assembly revised the NC Dental Practice Act. Now, under the general direction of a licensed public health dentist, specially trained public health dental hygienists can perform oral health screenings and preventive and educational services outside the public school setting.

The NC Institute of Medicine has begun exploring how to use dental hygienists to expand preventive dental services to underserved populations in federally-funded community or migrant health centers, state-funded rural health clinics, and the not-for-profit clinics that serve predominantly Medicaid, low-income or uninsured populations. A report is to be sent to the Governor and the Joint Legislative Commission on Governmental Operations no later than May 1, 2000.

In 1999, the General Assembly directed the NC State Board of Dental Examiners to establish a procedure for streamlined licensing of dentists and dental hygienists who have been practicing in other states. This should increase the number of qualified dental practitioners in the state. The proposed rules governing the new licensing pathway are to be prepared by May 15, 2000. The Board of Dental Examiners will determine which new procedures will be needed to allow less burdensome and more timely entry of qualified out-of-state licensed applicants, while still affording the public the same protection as under current law and procedures.

The NC Institute of Medicine is organizing a work group to study the feasibility of new residency programs in pediatric dentistry in addition to the current program located in Chapel Hill. The Institute will present a report to the General Assembly, no later than May 1, 2000.

On April 1, 1999, the state Medicaid program authorized use of ADA Procedure Code 1203, which allows reimbursement for the application of dental fluoride varnishes without a full prophylaxis. It also authorized pediatricians, nurse practitioners, or physician's assistants to apply these varnishes to the teeth of young children, allowing more rapid dissemination of this proven preventive procedure among the state's low-income children. Implementation began in Carolina Access II and III project sites in the fall, 1999, and should spread statewide in 2000. Furthermore, the General Assembly's 1999 session expanded NC Health Choice to cover dental sealants, fluoride treatment, simple extractions, stainless steel crowns, and pulpotomies.

Since publication of the Task Force Report in May 1999, considerable forward movement has taken place. It was apparent that the problems associated with poor dental care were severe, of immediate concern, and needed a broad, non-political analysis followed by action from public and private-sector policy makers and shapers. The key recommendation of the Task Force (to increase the level of payment to dentists for services provided to Medicaid beneficiaries) was not acted on in the 1999 session of the General Assembly, but it was seriously discussed in legislative hearings and will be considered further in the year 2000 legislative session.

Given the number of problems surrounding adequate health care for North Carolina's low-income populations, inquiries such as that described here can point the way to the concrete and feasible steps that need to be taken. There is reason to hope that nearly all of the 23 recommendations formulated by the Task Force will soon be implemented. The dental health of our population is an important goal, and one well within our reach. ❐

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A Community-Based Pharmaceutical Care Program for the Elderly Reduces Emergency Room and Hospital Use

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The proportion of United States residents over age 65 will increase from 13% now to 20% by the year 2030. This fact puts health issues relating to the elderly at the forefront of the nation's policy agenda. In large part because of age-related increases in the prevalence of multiple chronic diseases, persons aged 65 and over use more than one-third of all prescribed drugs[1] and 40% of all over-the-counter medications.[2] Properly prescribed, dispensed and administered, such medications improve lives and save healthcare dollars, but many seniors cannot afford to pay for medications. Over 47% of elderly residents in North Carolina have no insurance covering prescription drug payments.[3] In addition, the use of multiple, sometimes unnecessary medications (polypharmacy) and age-related changes in the distribution and elimination of drugs have important medical and financial consequences (including causing 5-23% of hospitalizations[4]). These facts suggest a need to improve both access to medications and management of drug therapies in order to reduce overall health care costs and reach optimal health in the elderly.

Senior PHARMAssist is a charitable, nonprofit, community-based program that currently serves residents of Durham County, NC, who are over age 65 and have incomes less than 150% of the federal poverty level (At the time of this study, income eligibility was restricted to seniors <140% of the povery level). Its main goals are to help seniors obtain and properly use necessary medications, and avoid unnecessary ones. Senior PHARMAssist provides personal medication reviews by a pharmacist to help educate clients about their medications. In addition, Senior PHARMAssist provides education about preventive health care measures, community resources, and financial assistance for appropriate prescription medications. For a complete description of Senior PHARMAssist, see the report by Upchurch.[5]

In this paper we evaluate the effectiveness of the Senior PHARMAssist program by examining longitudinal patterns of knowledge about medications, adherence to prescribed regimens, adverse drug reactions, emergency room (ER) use, and incidence of hospitalization at 6 and 12 months after enrollment in the program. The study is based on the Donabedian model[6] of health care delivery, in which structural characteristics affect the process of care, which in turn affects health and cost outcomes. Knowledge about and adherence to prescription regimens do not directly change health status or health care costs, but both factors potentially mediate such changes and therefore are important components of program effectiveness. Our hypothesis was that Senior PHARMAssist would increase client knowledge about why their medications were prescribed and improve adherence to their prescribed regimens. We expected to find a decrease in adverse medication reactions, number of emergency room visits, and number of hospitalizations.

Methods

Clients (or their caregivers) were seen in the Senior PHARMAssist office or in their homes every six months for a thorough review of current medication regimens. Over-the-

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Table 1. Descriptive characteristics of enrolled sample at baseline and follow-up

Characteristic	Baseline (n=387)	6 Months (n=211)	12 Months (n=121)
Age			
<75	47%		
75+	53%		
Sex			
Female	82%		
Male	18%		
Race			
White	47%		
Black	53%		
Federal poverty level			
Below	80%		
Above	20%		
Living arrangements			
Living alone	52%		
Not living alone	48%		
Education			
≤ 6th grade	30%		
7-11th grade	52%		
≥12th grade	18%		
Self-assessed health			
Poor/Fair	72%	66%	64%
Good/Very good/Excellent	28%	34%	36%
Impaired ADL†			
0 (none)	74%	80%	32%
1-2 (moderate)	20%	13%	11%
3-6 (severe)	6%	7%	8%
Impaired IADL‡			
0 (none)	36%	31%	24%
1-4 (moderate)	37%	48%	52%
5-8 (severe)	28%	21%	24%
Total no. prescription medications			
≤ 3	30%	23%	27%
4-5	27%	28%	26%
>5	43%	49%	47%
Knows purpose of prescription medications	69%	90%	90%
Complies with prescription medications	71%	74%	74%
Adverse reactions to prescription medications	10%	11%	7%
Any ER visit in past year	57%	51%	39%
Any hospitalization in past year	48%	46%	34%

† Activities of daily living
‡ Instrumental activities of daily living

Table 2. Logistic regression coefficients from model predicting "knowledge of medication purpose"

Variable	Estimate (standard error)	Odds ratio	p-value
Intercept	0.53 (0.48)		
Time			
6 months versus baseline	1.51 (0.18)	4.53	<0.001
1 year versus baseline	1.49 (0.23)	4.43	<0.001
Lives alone vs lives with others	-0.35 (0.18)	0.70	0.049
Number of IADL Limitations (1,2,3,4)	-0.28 (0.12)	0.75	0.019
Memory score correct (0-1, 2-3, 4)	0.28 (0.12)	1.32	0.020
Number of prescription medications	0.16 (0.10)	1.17	0.122

counter and herbal medications were reviewed in addition to prescription medications. Review sessions, conducted by a pharmacist, covered medication-related information, created a medication record for the client to share with health care providers, screened for drug interactions, and contacted prescribers and pharmacists to coordinate medication regimens. Each client was asked to demonstrate administration techniques for medication inhalers, eye drops, etc. If needed, the pharmacist modeled proper technique. Clients were given written materials covering relevant medical conditions and community resources for seniors.

Sample Population. Baseline interviews and medication reviews were conducted with 394 seniors (≥65 years of age) who enrolled in Senior PHARMAssist between June 1994 and May 1996. Seniors were eligible for the program if they had an income less than 140% of the federal poverty level, did not have private prescription coverage insurance, and were not eligible for Medicaid, which pays for prescriptions. At the time of analysis, 127 of the seniors had completed 12 months in the program; 7 were excluded from analysis because they were members of small racial minority groups or had extensive missing data, leaving a final population of 120. The final number is less than the original enrolled for the following reasons: 84 participants had not been in the program long enough, 75 left the program because they became eligible for prescription assistance (private insurance or Medicaid); 51 became financially ineligible when their income or savings exceeded eligibility limits; 28 died; 11 moved or could not be contacted; and 18 no longer used prescription medications, or had left the program.

Outcome Variables. At baseline, and after 6 and 12 months, we calculated the proportion of prescribed medications for which clients could correctly identify the therapeutic purpose ("medication knowledge"). Medication adherence was calculated as the proportion of prescriptions taken as prescribed on the label. Adverse medication reactions were measured as the proportion of prescription medications for which any adverse effects were reported. Clients or caregivers were also asked how many times they had gone to the ER or been hospitalized during the preceding 12 months (responses were dichotomized into *none* or *any* ER visits or hospitalizations in the past year).

Explanatory Variables. Binary variables were constructed for *poverty level* (income below the federal poverty level or not) and *living arrangements* (living alone or with others). Participants were asked to rate their health as poor, fair, good, very good, or excellent, and their responses were dichotomized into *poor/fair* or *good/very good/excellent*. Functional status was measured by a modification of the Duke University Center for the Study of Aging and Human Development's OARS methodology.[7] The number of limitations in performing activities of daily living (ADLs) and instrumental activities of daily living (IADLs) were classified as none, moderate and severe (for ADL: *none, 1-2, 3-4*; for IADL: *none, 1-4, 5-8*). The total number of prescription medications taken in the last month was grouped into three categories: *≤ 3*, *4-5*, and *>5*. The number of health problems was determined by client self-report according to following checklist of conditions: *arthritis or gout*, *asthma or respiratory or breathing disease*, *cancer or malignancy*, *depression*, *diabetes or blood sugar problems*, *epilepsy or seizure disorder*, *glaucoma or cataracts*, *heart disease*, *high blood pressure or hypertension*, *kidney disease*, *liver disease*, *Parkinson's disease*, *stroke*, *thyroid disease*, *ulcers*, or *other*.

Data Analysis. Longitudinal changes in medication knowledge, adherence, adverse reactions, and health service utilization after enrollment in the Senior PHARMAssist program were assessed using random effects logistic regression models. Generalized estimating equations were used to estimate the model parameters in order to accommodate statistical dependence among the repeated measures taken on the same subject over time. Since changes over time were not necessarily expected to be linear, time was represented as a categorical variable. In all models, explanatory variables that were not statistically significant at the $\alpha = 0.10$ level were dropped from the models.

The validity of the above analysis results rests on the assumption that clients included in the follow-up sample have no risk factors for adverse outcomes that differ significantly from the whole enrollment group. Analyses based on the subset of participants with complete data at all three time points revealed only minor differences in model results, which lessens but does not completely dispel concerns about potential bias due to informative dropout. Since inferences drawn from the complete-case analysis were consistent with the primary results, they are not presented here.

Results

Table 1 shows descriptive statistics of the sample at each of the three time points. Participants' knowledge of the reasons why they were taking their medications increased dramatically in the six months after enrollment. At baseline, clients knew why they were taking 69% of their medicines; this increased to 90% after 6 months, but there was no further increase during the subsequent 6 months. The observed improvement in knowledge of medication purpose was statistically significant (OR=4.5, $p<0.001$), after adjustment for important covariates (Table 2). Clients were more likely to know medication purpose if they were living with others, had fewer IADL limitations, and had a higher memory score.

Interestingly, there were no significant changes in adherence to medication regimens or adverse medication reactions

Table 3. Logistic regression coefficients from model predicting "one or more ER visits in past 12 months"

Variable	Estimate (standard error)	Odds ratio	p-value
Intercept	-1.08 (0.46)		
Time			
6 months versus baseline	-0.26 (0.15)	0.77	0.077
1 year versus baseline	-0.89 (0.23)	0.42	<0.001
Above vs below poverty level	-0.61 (0.28)	0.55	0.031
Lives alone vs lives with others	-0.52 (0.22)	0.60	0.018
Good/excellent vs poor/fair perceived health	-0.55 (0.19)	0.58	0.004
Number of IADL limitations (1,2,3,4)	0.44 (0.13)	1.55	<0.001
Number of health problems	0.53 (0.15)	1.69	<0.001

Table 4. Logistic regression coefficients from model predicting "one or more inpatient hospital stays in past 12 months"

Variable	Estimate (standard error)	Odds ratio	p-value
Intercept	-2.27 (0.49)		
Time			
6 months versus baseline	-0.14 (0.15)	0.87	0.350
1 year versus baseline	-0.77 (0.22)	0.46	<0.001
Above vs below poverty level	-0.69 (0.26)	0.50	0.009
Good/excellent vs poor/fair perceived health	-0.48 (0.21)	0.62	0.020
Number of IADL limitations (1,2,3,4)	0.71 (0.14)	2.03	<0.001
Number of health problems	0.52 (0.16)	1.70	0.001

over the 1-year period following enrollment. Clients reported taking 71% of their prescribed medication doses at baseline, and 74% at 6 and 12 months. Adverse medication effects were reported for 10% of medications at baseline and at 6 months; this had declined to 7.4% at 12 months but, although changing in the hypothesized direction, the trend was not statistically significant.

The proportion of clients who reported using an emergency room for any reason over the preceding year decreased from 57% at baseline to 51% after 6 and 39% after 12 months in the program. Logistic regression modeling, controlled for confounding factors, showed that the probability of an ER visit was reduced by 23% at 6 months after enrollment (OR=0.77, p=0.077) and by 58% at 1 year (OR =0.42, p<0.001) (Table 3). Other factors associated with ER use over a 12-month period were being below the poverty level, living with others, having poor to fair perceived health, having a higher number of IADL limitations, and having higher number of health problems.

As with ER use, enrollment in the Senior PHARMAssist program was associated with a lessened number of hospitalizations. At baseline, 48% of clients reported at least one hospitalization during the preceding year, compared to 46% at 6 months after enrollment and 34% at 12 months. After adjusting for potential risk factors, the decrease after 12 months in the program was significant (Table 4). In-patient stays were also associated with being below the poverty level, having poor to fair perceived health, having a higher number of IADL limitations, and having a higher number of health problems.

Discussion

Our evaluation of the community-based Senior PHARMAssist program shows a decrease in ER use and hospitalizations one year after enrollment. In addition, after just 6 months, clients improved their knowledge of why they were taking their medications, and this was sustained at 12 months. These findings suggest that the program's interventions lead to changes that can reduce health care costs incurred by low income seniors.

One goal of the program was to increase clients' awareness of and participation in their own health care. We found that talking to clients specifically about the purpose behind and proper administration of their medications did increase their knowledge. This speaks to the ability of seniors to learn about their medication regimen as long as they have access to client-centered education. When clients see several different prescribers or use different pharmacies, it is important for a single healthcare professional to have a clear and complete understanding of the client's pharmaceutical care. Since Senior PHARMAssist contacts prescribers and community pharmacists to clarify pharmaceutical care plans, clients' increased knowledge may have been the result of streamlined and coordinated care, which was thereby easier to understand.

We expected to find that Senior PHARMAssist improved adherence to medication regimens, but this was not borne out by the evaluation. There was a change in the hypothesized direction, but it did not reach statistical significance. There are several reasons why this may have been so. For example, adherence was measured by comparing clients' reported use to the directions on each prescription label. Any discrepancy was considered non-adherence even if a physician had verbally changed the administration schedule without writing a new prescription. In addition, the measure of adherence used here lumped together both intentional (because the medication was too expensive, caused side effects, seemed ineffective, "I didn't need it") and unintentional non-adherence (because clients forgot to take it or misunderstood directions). The program educated clients about their role managing medications, so it is possible that intentional non-adherence was a valid choice. Further analyses should take these possibilities into account.

Adverse medication effects did not decrease after one year in the program. There was a change in the expected direction, but it was not statistically significant. It is possible that clients learned to recognize symptoms as adverse medication reactions, so any decrease in adverse effects due to better prescribing may have been counterbalanced by increased awareness of medication-induced symptoms. If this is so, the modest reduction we found in reported adverse medication reactions may underestimate the positive influence of Senior PHARMAssist.

It is likely that the program's interventions had a direct effect on health status and health care costs, but this conclusion should be interpreted cautiously. Wallihan et al[8] found that older adults substantially under-report health services use. This means that self-reporting may lead to biased estimates of ER visits and hospitalizations, but we believe that within-person estimates of change over time should not be affected. In addition, because we did not study a control population for comparison, it is possible that changes attributed to Senior PHARMAssist were due to other, concurrent factors promoting health in the community. Similarly, the lack of a control population receiving only financial assistance but not an integrated program of education and coordination with prescribers, pharmacists, caregivers and home health providers, makes it impossible to determine the effectiveness of individual components of the program. Finally, the effectiveness of this program has been demonstrated for low-income seniors in Durham County, but we do not know that these findings can be generalized to other settings and populations.

Conclusions

The federal government has recently turned its attention toward providing prescription benefits to Medicare enrollees. In 1999, North Carolina expanded Medicaid eligibility to 100% of the federal poverty level for older adults and people with disabilities. However, both approaches address only medication access issues. Programs such as Senior PHARMAssist show the potential for cost benefits by combining access with client-centered education. We need further research on the cost-effectiveness and health benefits of such interventions to help guide policy decisions. For now, the observed benefits of Senior PHARMAssist merits expansion of our study to a sample of communities, ideally with matched control communities for comparison. ❐

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Prehospital ECG Transmission Speeds Reperfusion for Patients with Acute Myocardial Infarction

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Over the past decade, use of percutaneous transluminal coronary angioplasty (PTCA) has significantly decreased the morbidity and mortality of acute myocardial infarction (AMI) by visualizing acute occlusions and rapidly reestablishing flow through the infarct-related artery (IRA).[1] Only early and complete reperfusion results in a profound decrease in morbidity and mortality.[2,3] Even patients whose IRAs show less than complete reperfusion have lower mortality rate than those with no reperfusion.[3] Recent clinical trials show that PTCA restored complete or partial flow in the IRA of 93-98% of patients.[4-7]

Table 1. Comparison of time delays

Delay times	Control (27 patients)	Intervention (50 patients)	Difference
25th percentile	85 min.	64 min.	21 min.
50th percentile	109 min.	80 min.	29 min.
75th percentile	122 min.	100 min.	22 min.

Studies by Reimer and Jennings in dogs showed that the degree of myocardial salvage was greatest when reperfusion occurred within two hours after abrupt coronary occlusion.[8] Cannon et al[9] and Surypranta et al[10] showed that early primary PTCA led to considerable mortality benefit, and a recent report by Brodie et al identified a 2-hour time frame for achieving recovery of left ventricular function and improved survival in humans.[11] The time from infarction to reperfusion is vital to survival in AMI.

Emergency medical systems (EMS) and hospital emergency departments (EDs) have taken steps to reduce reperfusion delays, most often through the implementation of protocols for AMI triage and treatment[12-13] and through transmission of electrocardiograms (ECGs) by EMS to the hospital ED.[14-17] To minimize delays in primary PTCA for AMI patients, Guilford County Emergency Medical Services (GCEMS) and clinical cardiologists at Moses Cone Hospital evaluated the use of a prehospital ECG to reduce time to PTCA treatment. In the Timely Intervention in Myocardial Infarction (TIME) Trial, we compared time to reperfusion of patients without and with 12-lead ECG transmitted to the hospital before arrival in the ED.

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Methods

Patients. We used as controls 27 consecutive patients who had received primary PTCA for AMI in the period prior to beginning prehospital ECG intervention. Prehospital ECG transmission was begun in May 1995. After a 5-month pilot phase, we studied 50 consecutive AMI patients treated between October 1, 1995 and September 30, 1996. For control and intervention patients, elapsed time and clinical history and events were recorded on a GCEMS AMI Data Sheet (Appendix), as well as on National Registry of Myocardial Infarctions 2 (NRMI2) case report forms. We compared data from AMI patients treated with primary PTCA in the control and prehospital ECG intervention groups.

Study Protocol. All GCEMS paramedics were taught how to assess potential candidates for PTCA, complete the AMI data sheet, and obtain technically satisfactory 12-lead ECGs at the site of initial patient encounter. Paramedics were also taught to recognize various patterns of ST segment elevation indicating AMI.

Table 2. Patient characteristics for TIME intervention population

	Median	(25th, 75th Percentile)
Age in years	59	(50, 66)
Systolic BP	136	(116, 156)
Diastolic BP	84	(70, 91)
Pulse (beats/min)	77	(63, 86)
		No. of patients
Gender		
Female		19
Male		31
Race		
White		39
Black		9
Medical histories		
Myocardial Infarction		6
Angina		8
Prior PTCA		2
Prior coronary bypass		2
Stroke		2
Diabetes		11
Hypertension		20
Smoking		24
Family history of coronary disease		17
Elevated lipids		14
Chest pain on admission		44
ST elevation on admission		48
ST depression on admission		21
AMI location		
Anterior		18/48 (38%)
Inferior		25/48 (52%)

GCEMS ambulance units were equipped with remote-transmission, 12-lead ECG devices (Marquette Electronics). ECGs were transmitted to a responsible ED physician at Moses Cone Hospital, and ECG interpretation by the paramedic was voice-transmitted to the ED. Paramedics assessed each patient based on a specified protocol (Appendix), which included symptom characteristics, time of symptom onset, time of initial ECG, time of ED arrival, time of first hospital ECG, and vital signs (including blood pressures in both arms to rule out aortic dissection). Decisions about whether the patient was a candidate for thrombolytic therapy or primary PTCA were based on pertinent historical information.

ED physicians were authorized to assemble the cardiac catheterization team for possible PTCA. Prior to arrival in the ED, the responsible cardiologist had adequate information to make a final decision regarding emergency coronary angiography. Another ECG was obtained immediately upon patient arrival in the ED. An ED nursing team was dedicated to each patient to decrease time delays after arrival.

Elapsed times (from hospital ED arrival until documented coronary reperfusion) in control and intervention groups were compared using the Wilcoxon Rank Sum Test.

Results

The recorded time intervals for control and intervention groups are shown in Table 1. The median time from hospital arrival to primary PTCA was 109 minutes in the control patients (the 25th percentile was 85 minutes, and the 75th

Table 3. Clinical events in intervention group

Event	No. of Patients (%)
Hypotension	3 (6 %)
Recurrent Ischemia	6 (12 %)
Reinfarction	1 (2 %)
AV block (high degree)	1 (2 %)
Ventricular tach/fib	5 (10 %)
Other cardiac arrest	1 (2 %)
Pulmonary edema (Killip III)	1 (2 %)
Cardiogenic shock (Killip IV)	0
Death	1 (2 %)

percentile was 122 minutes). The median time from hospital arrival to primary PTCA in the intervention patients was 80 minutes (the 25th percentile was 64 minutes and the 75th percentile was 100 minutes). The difference in time to primary PTCA between the control and intervention groups was statistically significant (p=0.002). We made no attempt to compare morbidity and mortality in the two groups because our sample was small.

Table 2 shows the characteristics of the 50 patients in the prehospital ECG intervention group. Their median age was 59 years, two thirds were men, and the other demographics are typical of a community hospital population with AMI.

Hospital outcomes for the 50 patients in the intervention population are shown in Table 3. There was one death (2% mortality), and serious complications were minimal (1 reinfarction, and 6 cases of ventricular tachycardia, ventricular fibrillation, or other mechanisms of cardiac arrest). One patient had Killip Class III heart failure and none had Class IV.

Discussion

There is little doubt that time is of the essence in treating patients with AMI. Rawles found that the 5-year mortality rate for AMI patients treated with thrombolytic therapy within one hour was 20% lower than in those treated after more than one hour.[18] The GISSI-1 Study showed a 47% reduction in deaths of patients treated with thrombolytics within one hour of symptom onset,[19] and the MITI trial showed that patients treated within 70 minutes of symptom onset had an in-hospital mortality of only 1.2%, compared to 8.7% in patients treated after 70 minutes.[15] A pooled analysis of fibrinolytic trials showed a 30% reduction in mortality in those treated within 1 hour of symptom onset but only an 18% reduction in those treated 4-6 hours from symptom onset.[20]

The 29-minute decrease in median time from hospital arrival to primary PTCA in this study emphasizes the value of the transmitted ECG. When EMS personnel have recorded and transmitted a prehospital ECG, the ED is already prepared for immediate follow-up 12-lead ECG upon arrival, thus minimizing further delays. The results of our trial suggest that nurses and paramedics should be trained to recognize diagnostic ECG changes and should immediately transmit ECGs of patients with evidence of AMI to the ED.

Furthermore, ED physicians should have the authority to make decisions about reperfusion therapy. During the interventional phase of our study, ED physicians, armed with data from transmitted prehospital ECGs, were able to mobilize evaluation in both the ED and the catheterization laboratory. Though initially skeptical, cardiology staff became comfortable with ED physicians ordering emergent catheterizations. The ED physicians reliably limited “false alarms,” and this contributed to an efficient working relationship between the ED and the catheterization laboratory.

The demonstrated time saving with ECG transmission is so potentially significant that we are conducting a further study to determine we can reduce delays even further by transmitting the 12-lead ECG from the paramedics directly to the on-call cardiologist via a cellular telephone with a liquid crystal display. ❑

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Appendix: The Guilford EMS Acute MI case report form used for all patients enrolled in the trial.

Guilford County EMS
Acute MI
TIME Trial

Unit _____ Date ___ / ___ / ___

Patient's name ____________________ Age: _____ Sex: _____
Patient's primary physician ____________
Patient's cardiologist _______________

ASSESSMENT:

Approximate Time of SX Onset __:__
Time of EMS 12 Lead ECG __:__
Time of Arrival in ED __:__
Time of First ED ECG __:__

Location/description, risk/precipitating factors, associated symptoms determined should be recorded on ACR.

1	Y	N	Typical / classical chest discomfort
1	Y	N	Duration (> 30 minutes and <12 hours)
1	Y	N	Has the discomfort been constant?
1	Y	N	Oriented, can cooperate, is reliable?

SYMPTOMS:

5	Y	N	Nausea/vomiting
5	Y	N	Diaphoresis
5	Y	N	Shortness of breath
5	Y	N	Radiation of pain

VITAL SIGNS:

BP: Right _____ / _____ Left _____ /_____ Pulse: _____ Respirations: _____

9	Y	N	Is Left vs. Right BP different by >10mmHg?
9	Y	N	Systolic BP>180mmHg (after 3 SL NTGs)?
9	Y	N	Diastolic BP>110mmHg (after 3 SL NTGs)?

HISTORY:

Lytic Exclusion Criteria:

Y	N	Pregnant?
Y	N	Hx of bleeding problems?
Y	N	CVA, brain surgery, brain tumor or seizure Hx?
Y	N	Hospitalized in last 2 months? If Yes, why? ____________________
Y	N	Hx of recent GI bleed (<10 days)?
Y	N	Recent surgery/trauma (<10 days)?
Y	N	Hx of diabetic retinopathy?
Y	N	Previous Rx SK/APSAC?
Y	N	Takes blood thinners (Coumadin, Warfarin)?
Y	N	Meets criteria for lytic therapy?

Acute Cath . Exclusion Criteria

Y	N	Pregnant?
Y	N	Hx of bleeding problems?
Y	N	Hx of renal failure?
Y	N	Contrast allergy?
Y	N	Femoral/D. pedis pulses present?
Y	N	Meets criteria for cath?

____
EMT-P signature & ID number

Running the Numbers

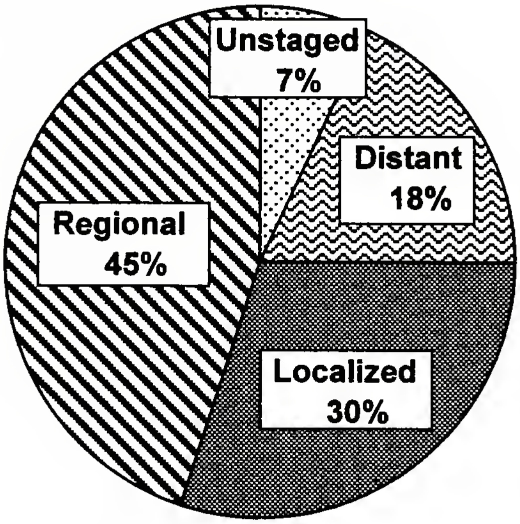
A Periodic Report to North Carolina Physicians and Their Patients
About Current Topics in Health Statistics

Paul A. Buescher, PhD, Editor

Cancer Data

The North Carolina Central Cancer Registry (CCR) started collecting data in 1990 on all new cases of cancer except common skin cancers and in situ cervical cancer cases. Hospitals report more than 30,000 new cases of cancer to the CCR each year. In comparison, there are approximately 15,000 cancer deaths per year. An important goal of the CCR is to provide cancer data to agencies involved in cancer prevention and control, including data to evaluate the success of cancer screening programs. Several types of cancer can be detected in early stages through readily available and often inexpensive tests.

For example, cancer of the colon and rectum can be detected early through several screening tests including the digital rectal exam, the fecal occult blood test, sigmoidoscopy, colonoscopy, and barium enema with air contrast. The latest survival estimates for the United States were prepared by the National Cancer Institute. If invasive colon and rectum cancer is detected in the localized stage (cancer is confined to the colon or rectum), the 5-year survival rate for all races, males and females is 90%. When the cancer is first detected at the regional stage (cancer has spread to adjacent tissues or nearby lymph nodes), the 5-year survival rate drops to 65%. And at the distant stage (metastatic disease), the 5-year survival rate is only 8%. These data make clear the advantages of early detection.



Colon cancer: stage at diagnosis.

In North Carolina, an average of 3,350 new cases of invasive colon and rectum cancer are diagnosed each year. The chart shows the percentage of colon and rectum cancers diagnosed during 1993-1997 at each stage. If all colon and rectum cancer cases were diagnosed at the localized stage, an estimated 860 lives would be saved each year.

Data from the CCR can be used to help evaluate the effectiveness of cancer screening programs in the state. We rely on hospitals and physicians to report all new cases of cancer so that our data will be of maximum benefit to cancer control programs in North Carolina. A future article in this series will address issues related to cancer data reporting and data quality.

From the State Center for Health Statistics
www.schs.state.nc.us/SCHS
North Carolina Department of Health and Human Services

Is Physician-Assisted Suicide Ethical? Is Euthanasia?

Bruce B. Blackmon, MD

> *I SWEAR by Apollo the physician, and Aesculapius, and Health, and All-heal, and all the gods and goddesses, that, according to my ability and judgment, I will keep this Oath and this stipulation to reckon him who taught me this Art equally dear to me as my parents, to share my substance with him, and relieve his necessities if required; to look upon his offspring in the same footing as my own brothers, and to teach them this Art, if they shall wish to learn it, without fee or stipulation; and that by precept, lecture, and every other mode of instruction, I will impart a knowledge of the Art to my own sons, and those of my teachers, and to disciples bound by a stipulation and oath according to the law of medicine, but to none others.*
>
> *I will follow that system of regimen which, according to my ability and judgment, I consider for the benefit of my patients, and abstain from whatever is deleterious and mischievous.*
>
> *I will give no deadly medicine to any one if asked, nor suggest any such counsel; and in like manner I will not give to a woman a pessary to produce abortion.*
>
> *With purity and with holiness I will pass my life and practice my Art. I will not cut persons laboring under the stone, but will leave this to be done by men who are practitioners of this work.*
>
> *Into whatever houses I enter, I will go into them for the benefit of the sick, and will abstain from every voluntary act of mischief and corruption; and, further from the seduction of females or males, of freemen and slaves.*
>
> *Whatever, in connection with my professional practice or not, in connection with it, I see or hear, in the life of men, which ought not to be spoken of abroad, I will not divulge, as reckoning that all such should be kept secret.*
>
> *While I continue to keep this Oath unviolated, may it be granted to me to enjoy life and the practice of the art, respected by all men, in all times! But should I trespass and violate this Oath, may the reverse be my lot!*
>
> Hippocrates, Works trans., Francis Adams (New York; Loeb) vol. I, 299-30

eth-ics *\'e-thikx\n.* ***a:*** *the discipline dealing with what is good and bad and with moral duty and obligation;* ***b:*** *a set of moral principles or values;* ***c:*** *the principles of conduct governing an individual or a group;* ***d:*** *a guiding philosophy*

When wrestling with complex ethical issues of medical practice, many of us are inclined to look back toward medicine's ethical "roots," to the Hippocratic Oath. Every doctor is familiar with it, but just how literal a guideline is it for us in practice? The oath says I should teach, *without fee or stipulation . . . the Art to my own sons, and those of my teachers . . . but to none other.* Well, that ought to ease the financial woes of medical schools, not having to pay any faculty salaries! And by those guidelines, I could never have become a doctor, since my father wasn't one. Nor could my pediatrician daughter, since she's not a son.

Into whatever houses I enter, I will go into them for the benefit of the sick. Remember, we have sworn by Apollo! *I will follow that system of regimen which, according to my ability and judgment, I consider for the benefit of my patients.* Who are my patients? As a family physician, if I saw a three-year-old with measles or polio, did I treat only that one patient, or did I tell the whole community they needed their shots? If I saw one meningitis case, did I only treat that case or did I try for prophylactic treatment of the family? When we treat a patient with AIDS, does our obligation of care extend to the rest of the family—the spouse, the children both born and unborn?

Dr. Blackmon is a gastroenterologist and family practioner. He can be reached at PO Box 8, Buie's Creek NC 27506.

I will give no deadly medicine . . . [or] a pessary to produce abortion. What are we to we do, then, about an anencephalic fetus still in utero? Must we leave this mother to suffer until spontaneous delivery? Some institutions have found it expedient to delete this phrase from the oath.

The good practice of medicine does not mean focusing narrowly on treatment of one illness with one drug for one period of time. If I am to "follow that system of regimen which, according to my ability and judgment, I consider for the benefit of my patients," then I am obligated to care for the patient *and* to treat the disease in the context of the patient's interests, family, and circumstances.

How should the Hippocratic ethos apply to the subject of assisted suicide and euthanasia? Perhaps we need to take a new look. We have put the laws in place that could send Dr. Kevorkian to prison, but three different juries failed to convict him (the fourth got him). Moreover, there is evidently considerable support among medical professionals for his position. A recent national survey of 1902 physicians (Meier DE, Emmons CA, Wallenstein S, et al. A national survey of physician-assisted suicide and euthanasia in the United States. New Engl J Med 1998;338:1193-201) found that "a substantial proportion of physicians in the United States . . . report that they have received requests for physician-assisted suicides and euthanasia, and about 6% have complied with such requests at least once." Eleven percent of the physicians report that, even under current legal restraints, there are circumstances in which they would prescribe medication that a competent patient could use to end his or her life; 36% said they would prescribe such a medication if it were legal to do so. Seven percent said that under current legal constraints, they would administer a lethal injection to a competent patient under appropriate circumstances; 24% said they would do so if the practice were legal.

American medicine must face squarely these requests for help with assisted suicides and/or euthanasia. These are multifaceted problems. Surely we must continue study and research and training for Hospice and other end-of-life care, but we are still going to have to deal with patients and families who have reached the end of the rope, but for whom death has not yet come. Either we take the lead and help make legal provisions for giving relief to the patient and family, or the courts and legislatures will make the decision for us.

Statistics from Holland show that, if no assistance is given, patients usually linger 3-4 weeks after they have requested assisted suicide or euthanasia. Think how horrible those three weeks must be for the patient and family—all dressed up for death and then the bus is 3 or 4 weeks late—the pain, the heartache, the loss of sleep by family and friends trying to serve a loved one, exhausted almost beyond endurance and in some cases beyond endurance, and the bus is late.

I've had my three score and ten, and they have been good years. When I have my big one and some good physician and hospital staff have done all for me that they can, and there is no hope; when "Bruce" is gone and only a hunk of protoplasm is left; when I have voted, "let's go now and not drag it out"; when my family are psychologically ready to let me go—THEN, I want the laws of North Carolina to protect from loss of license and livelihood that physician or nurse who helps me to die in peace instead of just "pulling the plug" and then allowing me to starve to death, slobbering, gasping for final breaths, and soiling myself and the bed for hours or days while the family sits around praying, "Lord, he's been through so much. Please take him peacefully." (Incidentally, rescuing me and my family from those last three weeks will save enough in medical expenses to buy a good chunk of my granddaughter's education.) Surely there can be no greater abandonment of a patient than to "pull the plug" and then just leave him to die with no nourishment or water.

After this, no one of you who reads this can ever say you have never been asked to assist in euthanasia. I'm asking you now. Please don't let me starve to death just because you have already assisted by pulling the plug. After all, pulling the plug is only the beginning of perishing to death, dehydration, lack of oxygen in the lungs, kidney shut-down, etc. The local vet would be run out of town if he treated your favorite pet like that. The SPCA would have him in court for cruelty to animals, and they would win, and they should win. Treat me at least as well as you would treat a dog. Just give me a shot and let me go to sleep, and let my family have some peace.

Amen. ❐

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Trying to Do the Right Thing

Two Cautionary Tales

The Tripartite Arrangement—Don't Go There Without Somebody!

Donald T. Lucey, MD, FACS

After 29 blissful years as a urologist, trying to do my part by providing quality professional health care for my patients, I opened an envelope one day and launched a two year trip into the unknown.

Most of us physicians spend much of our early lives preparing to be doctors. We practice our profession to the best of our abilities. To then receive a notification of an impending malpractice suit is unnerving, to say the least. In my case, the alleged event had occurred 6 years earlier. At first, I had difficulty even remembering the patient or the circumstances surrounding his case. Now I have every facet memorized. I will never forget any of the details, even though I would just as soon forget—if I could. An immense amount of my time for two years was devoted to worrying about the case, attending a number of depositions, preparing mentally for my own deposition, and meeting with attorneys in preparation for a potential jury trial.

I carry good malpractice insurance—$3,000,000 maximal coverage—and my physician-owned insurance company sent me a list of "legal service providers," from which I selected an attorney team. The date for trial was set for about one year in advance, but I always thought the case would not go to trial. I was certainly wrong. In North Carolina we have a legislatively constructed mandatory mediation experience presided over by an independent judge. Both defendant and plaintiff are supposed to just talk and attempt to settle. It did not occur in my case; in fact, no one really talked and no compromise was ever offered. So we went to trial. That is the experience I want to share with the readers.

My wife and I approached the trial as a team. We soon found that we were involved in a tripartite contract, a liaison of three parties in a unique and strange relationship. Of course, "tripartite" means an arrangement of three parties, such as an alliance of three countries, banded together for purposes of mutual protection. In other words, a treaty. But nothing in the definition suggests equality between the three parties; that is just an assumption most of us make in our understanding of this term.

To further clarify the term tripartite, let me describe the contract for you. Physicians pay premiums to a malpractice insurance company, which then hires attorneys to provide legal defense if the physician client needs it. Clear so far, wouldn't you agree? However, the attorney team is paid not by the doctor but by the insurance company. That makes one part of the contract two-sided—that between company and attorney. The third party—the physician—lives to some degree under the burden of an "odd man (or woman) out" philosophy. The attorneys are beholden to the insurance company because the company pays them. The physician clients do not pay the attorney directly, and thus the problem. At some point—as in my case—a conflict of interest may occur. Doctors need to know this; I certainly did not. I'll explain what happened.

When we went to trial the declared amount of monetary reward sought was $3,000,000, the maximum of my coverage. Should I lose, I was covered for this amount so I was "okay." Of course, I still had to prepare for a trial, which took the better part of three weeks. Then, the day the trial began, my attorney called us in to announce that the monetary damages sought had been raised by the plaintiff from $3,000,000 to $6,000,000. Since this was not a frivolous case, I knew that I could lose. The patient was disabled as a result of the disease from which he suffered. He needed crutches in order to walk.

The attorneys declared that their responsibility ended at the $3,000,000 limit set by my insurance policy. The attorneys said I would need additional legal assistance. This was an unpleasant surprise for which I was totally unprepared, but my wife and I then met with our personal attorney to plan how we would handle the additional financial risk. Then we met with representatives of my physician-owned malpractice insurance company who advised us that they thought we would win the case based on their expert review of all the documents. However, even though the company thought we would win, and *they* wanted to take our case to go to trial, they would not cover us for the additional $3,000,000. I actually wanted to settle: I wanted to go back to work and do what I do—practice medicine. I do not like being in the courtroom or being on trial. You cannot smile, grimace, laugh, or even talk to anyone in the elevator. I would describe myself as a mild-to-moderate extrovert. It was rough being under a lid for three weeks.

Well, the final choice was not mine. The company wanted to go to trial and we did—with me at personal risk for $3,000,000! Fortunately I was found not guilty by unanimous verdict of the jury (in North Carolina a unanimous verdict, not a simple majority, is needed to acquit a person in a civil court). To say that I was relieved when the verdict was read is certainly an understatement.

Now I am back at work every day and enjoying the humdrum life of being an ordinary physician not involved in a jury trial. I will never forget the experience. I learned a lot but here I want to focus on the peculiarly fashioned tripartite contract. Two of those three parties—say, the attorneys and insurance company, as in my case—can decide what *they* want to do, and you will just have to go along with it, even if it puts you at considerable personal financial risk. So my advice is, Don't go alone. Take your spouse, for certain, because you will need plenty of support. Involve your personal attorney, another important somebody, from the very start of the suit and meet with your attorney frequently. It is obviously important to think that the worst can happen and to plan carefully in case it does.

I am grateful for my attorney team. They were terrific. I am happy we selected them. They worked hard, as hard as I do, and went out of their way to defend me in my "hour" of need. I consider them both to be good friends now. They were focused, stern, compassionate, sensitive, and professional. At the same time they could both be, on the turn of a dime, personal, humorous, light-hearted, and happy. Come to think of it, I think they would both make good doctors. ❐

Reporting Suspected Child Abuse—Not Without Its Risks

Frederick Nesbit, MD

My recent experience may serve as a warning to physicians that reporting suspected child abuse can lead to a costly, time-consuming, harrassing adventure and the threatened loss of professional standing.

A call came to our office from a mother of an 8 year-old, pleading that her son be seen as an emergency because the child was threatening to run away from home. We accommodated her by arranging an appointment that very same day. I saw this child for a single visit together with his adoptive mother, and our entire session lasted less than a half-hour. The boy was repeatedly hushed by the mother who did nearly all of the talking. She admitted that she had "smashed his behind with a leather strap." Under the conditions, no evaluation or diagnosis of the child was possible, since the mother did not allow the boy to speak for himself or to be interviewed individually.

Apparently she had been unable to get an appointment with the child's pediatrician (who is known for his expertise in dealing with cases of child neglect or child abuse). I insisted on fulfilling my duty by calling his pediatrician as well as Child Protective Services, but she forbade me to notify anyone. She abruptly took the child and left my office, angrily assuring me that she would not return. I immediately phoned her pediatrician and also Child Protective Services.

Within a few weeks the Board of Medical Examiners summoned me to appear for an informal discussion of the case. Attached was a copy of the 13-page letter written by the mother. I found it to be a diatribe, full of allegations about my reputation that she had supposedly heard from other doctors and from their office personnel, and including her allegation (untrue) that I had diagnosed the child as "depressed" and in need of Prozac. I complied with the Board's request to appear. I was quizzed about the use of Prozac in treating children, and I acknowledged that even though this had not been approved by the FDA, its use in children was an accepted and commonly used practice. In the encounter in question, however, I am positive that I offered no diagnosis and did not mention the name of any drug. I was surprised that the Board appeared to accept at face value the woman's allegations about my diagnosis and treatment recommendations. At the conclusion of this session, I was thanked for my cooperation, and was assured that no record of this would be made. However, the Board requested that I be examined by their psychiatric consultant regarding my competency to practice medicine.

Last October the American Academy of Psychiatry and the Law met in Baltimore. I attended a session on the legal requirements of the various state regarding suspected cases of child abuse or neglect. I brought with me to my meeting with the Board a copy of the brief statement concerning North Carolina regulations. I handed this to the Chairperson who "would not take the time to read it". Now I wonder whether the North Carolina Board of Medical Examiners does not act with excessive zeal, and whether it is exploiting the quasi-judicial position it enjoys. Also, I wonder whether other physicians who wish to report suspected child abuse will think the risk worth their professional careers. ❐

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CASE REPORT

A Woman with Diarrhea, Weight Loss, and a Gassy Liver

Section of Gastroenterology
Wake Forest University School of Medicine

SERIES MODERATOR: Walter Roufail, MD, Clinical Professor of Medicine
PRESENTER: Vaman S. Jakribettuu, MD, Gastroenterology Fellow
DISCUSSANT: Joel Bruggen, MD, Assistant Professor of Medicine

---

Dr. Jakribettuu: *A 65-year-old woman was referred to the GI clinic for evaluation of diarrhea for 6 months. She had 3-4 loose stools per day, but noticed no blood or mucus. She had lost approximately 50 pounds of weight in the last year.*

Two months before her clinic visit she was found to be anemic and began oral iron supplementation on the advice of her physician. A computed tomogram (CT) of the abdomen at the time showed air in the intrahepatic biliary tree. She denied fever, chills, vomiting, abdominal pain, early satiety,

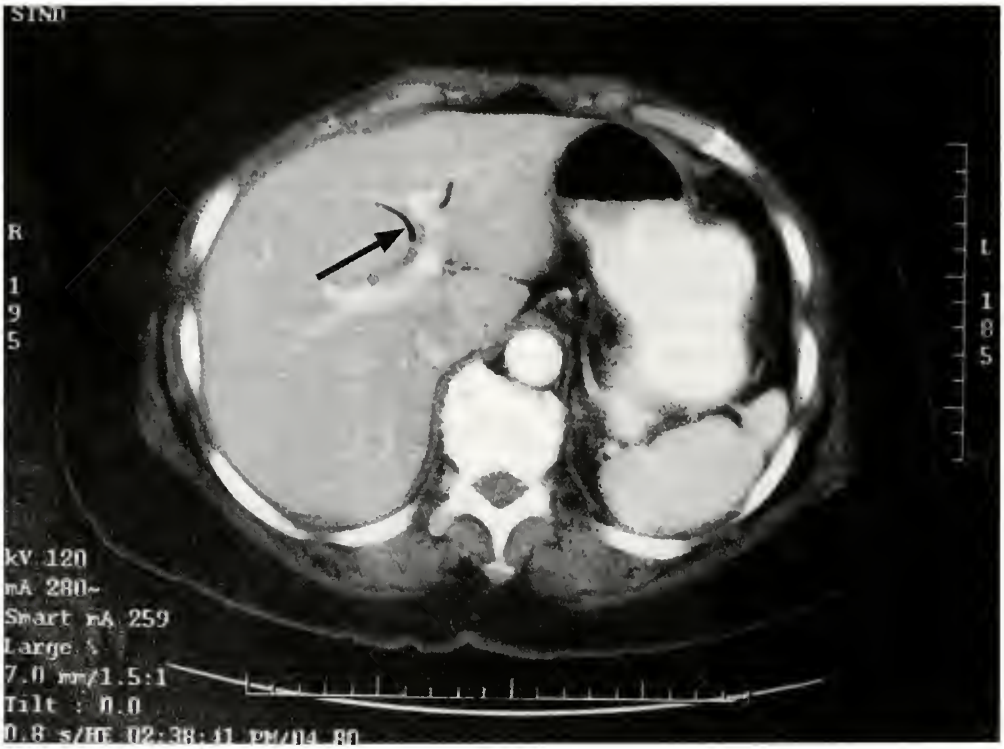

Figure 1. CT of the abdomen showing air in the intrahepatic bile ducts (arrow).

anorexia, or jaundice. She was mildly nauseated. She had undergone hip replacement for arthritis, but had never had abdominal surgery or any endoscopic procedures. She was a smoker but did not drink alcohol. There was no family history of colorectal cancer or inflammatory bowel disease.

Physical examination revealed a healthy, mildly obese woman with no jaundice. Abdominal and systemic examinations were unremarkable. Stool was negative for occult blood. White cell count was $4.6x10^9$*, hemoglobin was 12.1 g/dL with mean corpuscular volume of 91.4 fL and platelet count of* $356x10^9$*. Serum electrolyte and liver enzyme concentrations were normal. Abdominal CT films showed pneumobilia (Figure 1).*

Dr. Bruggen: This older woman had a recent change in bowel habit, anemia and significant weight loss. Her erythrocyte indices suggest anemia of chronic disease and her stool was negative for occult blood, but an intestinal malignancy such as colon cancer should still be considered in the differential diagnosis. Colon cancers do bleed intermittently, and her recent intake of iron might have changed the erythrocyte indices.

Other possible causes for her symptoms include malabsorption syndrome (celiac disease, chronic pancreatitis or pancreatic cancer), inflammatory bowel disease—particularly Crohn's disease, or an endocrinopathy (hyperthyroidism, gastrinoma, VIPoma, etc.). However, the finding of pneumobilia on the CT scan considerably narrows the diagnostic possibilities. Incidentally, pneumobilia is occasionally seen on plain radiographs of the abdomen (producing the "saber" sign, named for the shape produced by the air in the common bile and left hepatic ducts, or a Y-shaped translucent shadow in the right upper quadrant).

Pneumobilia usually indicates serious pathology unless it is seen after a procedure such as endoscopic retrograde cholangiopancreatography (ERCP), percutaneous transhepatic cholangiography (PTC) or surgery. Our patient had had none of those. Other causes of pneumobilia are listed in Table 1. At this stage we can rule out an incompetent sphincter of Oddi with retrograde filling of bile duct with air, because that is usually asymptomatic, with air discovered on abdominal radiographs made for other reasons. The lack of fever, chills, jaundice and the absence of findings on clinical exam virtually exclude rare but life-threatening diseases such as hepatic abscess, cholangitis or emphysematous cholecystitis.

Table 1. Causes of Pneumobilia

- Biliary enteric fistulae
  - Cholecystoduodenal
  - Cholecystocolic
  - Cholecystogastric
  - Choledochogastric

- Incompetence of sphincter of Oddi

- Bronchopleurobiliary fistulae
  - Thoracoabdominal trauma
  - Inflammatory lesions of the right lung

- Emphysematous cholecystitis
- Liver abscess
- Small bowel obstruction
- Intestinal pseudoobstruction
- Gas containing gallstones
- Congential abnormalities

The duration of symptoms suggests a chronic disease process, and biliary-enteric fistulae should be considered because they account for more than 90% of causes of pneumobilia.[1] Cholecystoduodenal fistulae make up 70% of all bilioenteric fistulae, and the rest are cholecystocolic, cholecystogastric and choledochoduodenal fistulae. Most occur in women[2] with a long history of biliary disease[3]. The fistulae may lead to further complications such as gallstone ileus, gastrointestinal bleeding or cholangitis.

I am still concerned that our patient presented with diarrhea, weight loss and anemia. This makes me suspect a cholecystocolic fistula secondary to a malignant neoplasm. These fistulae are notoriously associated with significant weight loss, diarrhea, and dehydration, because bile salts bypass the terminal ileum, where they are usually absorbed, and produce a direct cathartic effect in the colon. The result is diarrhea and steatorrhea from fat malabsorption. Less likely are an ampullary carcinoma leading to an incompetent sphincter of Oddi or an antral ulcer or carcinoma eroding into the biliary tree.

We need to remember that a significant number of biliary-enteric fistulae due to chronic cholecystitis show a deceptive lack of systemic symptoms[4] until the fistula itself produces secondary complications. I hope for the sake of our patient that this is what she turns out to have.

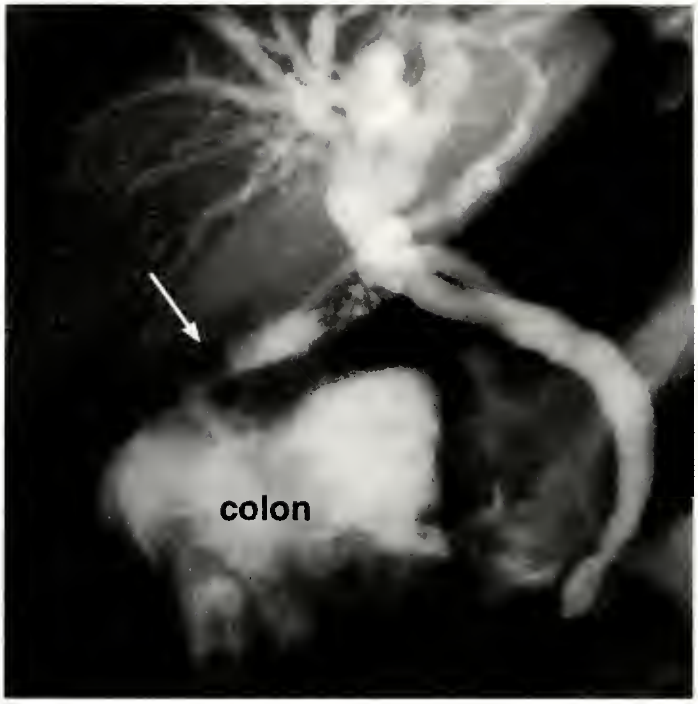

Figure 2. ERCP showing cholecystoduodenal fistula (arrow). Contrast injected into the bile ducts appears in the colon.

CLINICAL IMPRESSION: I believe the patient had a cholecystocolic fistula secondary to colonic neoplasm or chronic cholecystitis. I would suggest colonoscopy, followed by upper GI endoscopy if necessary.

Dr. Jakribettuu: *The patient underwent colonoscopy including intubation of terminal ileum. The study was normal. Esophagogastric duodenoscopy showed only a simple duodenal diverticulum.*

Dr. Bruggen: Then we should attempt an ERCP. I hope the duodenal diverticulum will not make it difficult.

Dr. Jakribettuu: *ERCP was successful and revealed a contracted gallbladder with a fistula between the gallbladder and the hepatic flexure of the colon (FIG 2). The patient underwent surgical repair. At operation, the gallbladder was shrunken, fibrotic and densely attached to the hepatic bed. Cholecystectomy and fistulectomy were successful and colonic fistula tract was oversewn. The patient had an uneventful postoperative course and is currently doing well. Her diarrhea has resolved, and she has gained weight 6 months after surgery.*

FINAL PATHOLOGIC DIAGNOSIS: **Chronic cholecystitis with cholecystocolic fistula.**

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Carolina Physician's Bookshelf

Edward C. Halperin, MD, Book Review Editor

The Dress Lodger

by Sheri Holman
(New York, NY: Atlantic Monthly Press, 2000. 291 pp. $24 hardcover.)

Reviewed by Florence Nash
Managing Editor

A friend recommended this novel because of my interest in medical history. I thought I had heard her wrong: "Dress Lodger?" This is a book about medical history?

In early 19th-century England, it turns out, a dress lodger was a prostitute living in a common lodging house, one step from homelessness. The landlord would lend her an expensive gown in which to ply her street trade. The dress attracted higher-class customers and better fees; the landlord got most of the take; the girl got her lodging and the rare pleasure of a pretty dress.

The story of this particular young dress lodger, Gustine, is set in the port town of Sunderland in 1831, when the cholera sweeping across Europe first reached England. Gustine is a distinct, original, and believable protagonist whose considerable adventures make in themselves a good, well-written story. But the book's real gold—what sinks in and stays—is its brilliant, horrifying images of daily life in the shadow and stink of back-street Industrial England, and its tale of the struggling advances of medical science.

Cholera advances inexorably as a tide, and who knows how. Borne by rats? water? lice? miasma? Crowds flock to melodramas about *cholera morbus*; broadsides offer confused advice on avoiding contamination. At the same time, English newspapers are full of the Burke and Hare scandals in Scotland, the disclosure that beggars and derelicts are being murdered to furnish medical schools with always-scarce cadavers. (Rumors at that time that cholera was spread among the poor to furnish bodies for medical schools have modern resonances: AIDS has spawned its own paranoid theorists who see a mysterious scourge as a conspiracy of the powerful to rid society of undesirables.)

Surgeon Henry Chiver, fleeing the anatomy scandals in Edinburgh, is looking for bodies to continue his teaching and research in Sunderland; his consuming interest is the heart. Gustine, as it happens, has a baby with *ectopia cordis*. Her fellow lodgers are beginning, suddenly and gruesomely, to sicken and die. Henry's and Gustine's paths cross.... Because this is a story of spreading disease, the vivid descriptions of vermin, the lodgers' filthy straw pallets, children playing in the open drains, tick in the reader's expectations like a bomb.

The author, a terrific writer, casts a modern and lively eye on historic settings (her first novel, *A Stolen Tongue*, is set in the 15th century) and creates a world that we can smell and feel and move around in, suffused with sharp social observations. She writes like the dickens, in fact—and, like Dickens, she can pair social tragedy with human comedy so that the reader winces and smiles at the same time, both entertained and educated.

Ms. Holman, who lives in New York, conducted much of her exhaustive research for this book in the collections of the New York Academy of Medicine, the University of Newcastle, and the Hunterian Museum in London. She spent considerable time in the city of Sunderland, delving into contemporary correspondences, news accounts, and civic records, and exploring its old streets and alleyways. And she even came to Duke Medical Center to observe an autopsy.

For this review, I asked Duke infectious diseases specialist Daniel Sexton, MD, to comment on the accuracy of a few excerpts. He replied that, while some of the statements were confusing out of context, he found some of them "brilliant." Holman's description of cholera "passed hand to hand like a pestilential Olympic torch," he wrote, "would have met the approval of Semmelweiss and maybe even Lister." The book is good history and a good read. I recommend it heartily. ❐

Readers are invited to submit for review books of potential interest to *Journal* audiences, including works on any aspect of medicine, or by North Carolina physicians. Send them to Dr. Halperin at Box 3085, DUMC, Durham NC 27710.

Carolina Physician's Roundtable

Edward C. Halperin, MD, Section Editor

The Role of Episiotomy in Modern Obstetrics

What's the role of episiotomy in modern obstetrical practice? It has been argued that that the main benefits of episiotomy are the prevention of third degree tears at the time of childbirth, the prevention of long-term damage to the pelvic floor, and the protection of the baby from the adverse consequences of an extended second stage of labor. On the other hand, some experts argue that, compared with a natural tear, episiotomy results in more bleeding, more pain, more permanent vaginal deformity, and more difficulties with sexual intercourse.[1] *The World Health Organization has gone on record as recommending that "the systematic use of episiotomy is not justified. The protection of the perineum through alternative methods should be evaluated and adopted."*[2]

The North Carolina Medical Journal *invited two practicing obstetricians/gynecologists to comment on this issue:* ***John M. Thorp, Jr., MD, from UNC-Chapel Hill,*** *and* ***Robert K. Yowell, MD, of Durham Obstetrics and Gynecology.*** *Readers of the* Journal *are invited to participate in the conversation via* Letters to the Editor, *either by mail to Box 3910, DUMC, Durham 27710 or by email to* nash0004@mc.duke.edu. —ECH

Dr. Thorp:

Episiotomy is a twentieth century, American phenomenon. Leading obstetricians advocated its routine use in the early 1920s and, unencumbered by any supporting evidence, it became a prominent part of childbirth. Advocates claimed its use would: (1) diminish severe injury to the rectum at childbirth and (2) protect against pelvic floor dysfunction at midlife. These theories were never tested and the literature quickly turned to arguments on the preferable incision type.

In the 1980's, prospective controlled studies were done to support or refute the hypothesis that routine episiotomy would diminish severe perineal injury. Paradoxically, the studies demonstrated that midline episiotomy increased the risk of rectal injury 20- to 30- fold, and that mediolateral episiotomy offered no protective effect. When these data are analyzed using multivariate techniques, midline episiotomy is the predominant factor contributing more to the risk of rectal injury than birthweight or use of instruments. An accoucher in a nuliparous woman can reduce her risk of rectal injury from 150/1000 to 5/1000 by not cutting her perineum.

What about the argument that episiotomy protects against future pelvic floor dysfunction? This is a difficult question to refute or support because the event in question proceeds the outcome by years (exceeding the deadlines for tenure decisions and the duration of federal grant support). Moreover, there are multiple confounding variables to control, e.g., family size, exercise, nutrition, timing of menopause, not to mention our collective ignorance about how to assess pelvic floor function and the lack of a paradigm to explain how the pelvic floor works. The burden of proving the prophylaxis argument remains at the feet of those who have postulated such. Until evidence in support is forthcoming, it cannot be taken seriously nor used to justify a procedure that increases rectal injury risk.

Given the above, we have called for limited use of episiotomy. We would limit its use to those obstetrical situations where mother or baby would benefit from shortening the second stage of labor. Such situations would include fetal distress or maternal medical problems.

The information above raises questions for clinicians and patients. Why is episiotomy still a routine in many hospitals and birth centers? Does a mother-to-be have any say-so in decision making regarding episiotomy use? Given that absolute allegiance to individual autonomy is cultural totem, bowed to by all in our society, and that neither scientific data nor the lack thereof has altered clinical practice, I have long pondered these queries. In response I have suggested that episiotomy be treated as other surgical procedures and specific informed consent be obtained prior to its routine use. One wonders how many women informed of the above would give their consent? Likewise, one must speculate that a clinician who does not obtain consent prior to routine episiotomy opens him/herself to claims of autonomy violation should complications ensure. While North Carolina informed consent law is relatively weak (would *any* reasonable person give their consent for the treatment in question?), plaintiff's attorneys in other jurisdictions find this argument attractive, as do juries.

Dr. Yowell:

I think an episiotomy should be done when necessary. It can reduce the chance of permanent injury to the pelvic floor. Furthermore, an episiotomy when done appropriately, can reduce the risk of lacerations of periurethral tissue, perineal body, and vagina.

An episiotomy can facilitate the delivery of the baby in certain clinical situations such as macrosomia – shoulder dystosia, malposition, occiput transverse/occiput posterior breech, vaginal birth after a prior cesarean section, and fetal distress calling for a vacuum extraction or forceps delivery.

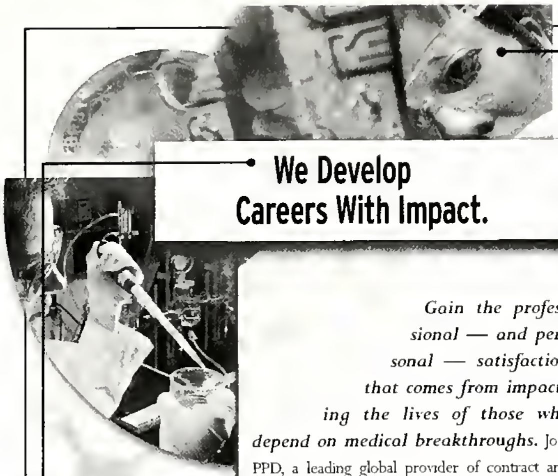
Finally, an episiotomy incision is much easier to repair than a tear.

I think it is important, on the other hand, to remember certain caveats when employing episiotomy. It is important to discuss the use of episiotomy with the patient. If there is a strong wish on the part of the patient to avoid an episiotomy unless "absolutely necessary," this should be properly documented and every effort made to comply. In addition, it is essential that the episiotomy repair should be carefully performed with the appropriate suture material. Reconstruction of the perineal body and precise attention to third and fourth degree extensions if they occur is vital. I never perform a mesiolateral or "hockey stick" episiotomy.

References

1 Wagner M. Episiotomy: a form of genital mutilation. Lancet 1999;353:1977.

2 WHO. Appropriate technology for birth. Lancet 1999; 353:1977.



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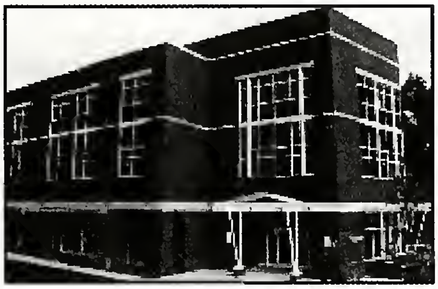

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CME Calendar

March 6-10

The Alton D. Brashear Postgraduate Course in Head and Neck Anatomy

Place:	Virginia Commonwealth University School of Medicine, Richmond, VA
Credit:	43 hours, Acaedmy of General Dentistry
Fees:	$450 physicians/dentists; $300 residents
Info:	Dr. Hugo R. Seibel VCU Dept. of Anatomy Tel 804/828-9791.

March 14-19

Duke Urologic Assembly

Place:	Caesar Park Beach & Golf Resort, Cancun, Mexico
Credit:	16.0 hours, Category 1, AMA
Info:	Duke Office of CME; Department of Urlogic Surgery Information Email: mace0001@mc.duke.edu Registration: 919/684-2033

March 24-26

2nd Annual Clinical Relevance of Medicinal Herbs and Nutritional Supplements in the Management of Major Medical Problems

Place: Friday Center, UNC-Chapel Hill
Credit: Up to 17 hours, Category 1, AMA; 20.1 hours, ANCC; 16 hours, pharmaceutical education
Fees: $385 doctoral level; $275 professional level
Info: Office of CME, UNC-Chapel Hill; 919/962-2118

March 29-April 2

International Conference on Physician Health

Place: Seabrook Island, South Carolina
Credit: Up to 23 hours, Category 1, AMA; family physician CME credit also available
Fees: AMA/CMA members $195 pre-reg., $250 on site; nonmember physicians $500; residents $120/$200; students $75/$150
Info: Cosponsored by AMA and the Canadian Medical Association. For abstract forms, registration and fee information: AMA Physician Health Program, 515 N. State St., Chicago IL 60610; 312/464-5066 or 800/621-8335; *email*: elaine_tejcek@ama-assn.org.

March 31 - April 1

Neurology Update for the Primary Care Provider

Place: Hawthorne Inn and Conference Center, Winston-Salem
Credit:
Fees:
Info: Wake Forest University Office of Continuing Education, 336/716-4450.

April 18

Medical Grand Rounds: "A Good Death: Fact or Fiction?"

Place: WakeMed Physician Conference Dining Center
Time: 12:30-1:30
Credit: 1 hour, Category 1, AMA
Fees: None
Info: Dr. Donald Lucey, Wake Urological Consultants 919/781-7113

June 12-16

Ninth Annual Advanced Cardiovascular Interventions Symposium

Place: The Westin Resort, Hilton Head Island, SC
Credit: Up to 21 hours, Category 1, AMA
Fees: Physicians $850; nonphysicians $500
Info: Meetings and Events, toll-free 877/716-2762; *website:* www.cvintervene.org

July 13-14

Bridging Research and Care: World Alzheimer Congress 2000

Place: Washington Hilton and Towers, Washington, DC
Credit: Up to 11.75 hours, Category 1, AMA (pending)
Fees: $200
Info: 312/335-5813; *email*: alzheimer2000@alz.org; *website*: www.alzheimer2000.org

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The *Journal* will consider for publication articles relating to and illuminating medical science, practice, and history; editorials and opinion pieces; letters; personal accounts; poetry and whimsical musings; and photographs and drawings. Papers that relate to the present, past, or future practice of the health professions in North Carolina are especially pertinent, but manuscripts reflecting other perspectives or topics are welcomed. Prospective authors should feel free to discuss potential articles with the editors.

Manuscript Preparation

Prepare papers according to the "Uniform Requirements for Manuscripts Submitted to Biomedical Journals" (N Engl J Med 1991;324:424-8) with the following exceptions: 1) no abstract is needed; 2) no running title is needed; and 3) report measurements in metric units; use of the International System of Units (SI) is optional.

Submit a cover letter and a 3 1/2-inch computer disk that contains the text written in MS DOS- or Macintosh-compatible format. *Also enclose three hard copies of the text for review purposes.* Double space text with one-inch margins. *Please do not "format" the text* (e.g. no variations in type size, no bold face, no italics, no embedded endnotes).

Submit photographic illustrations, in duplicate, as high-quality color 35mm slides or 5-by-7 or 8-by-10-inch glossy prints, or as black-and-white glossy prints (5-by-7 or 8-by-10-inch). Label all illustrations with author's name, number them sequentially according to their position in the text, and indicate the orientation of the images, if necessary. *Do not write directly on the backs of prints.* This can damage them. If figures require printing in four-color process, we may ask the author to pay printing fees or a portion thereof.

Submit tables, charts, and graphs as hard copy *and* include copies on disk, in their original format *and translated as TIFF, PICT, or EPS documents.* Type all figure legends separately. Type and double-space all tables, one to a single sheet of paper. Tables must have titles and consecutive Arabic numbers.

Keep references to a minimum (preferably no more than 15), retaining those that document important points. The "Uniform Requirements" cited above contain reference format. We customarily list the first three authors for "et al"-type references. Authors are responsible for the accuracy and pertinence of all citations.

Avoid abbreviations entirely if possible; keep them to a minimum if not. When used, completely define abbreviations at the first point of usage in the text.

Manuscript Review and Editing

A medically qualified editor reads all manuscripts and, in most instances, sends them out for further review by one or more other members of the North Carolina Medical Society. *Authors' cover letters must include a line that states that their submitted manuscripts are not under consideration for publication elsewhere. It is not the Journal's policy to reprint previously published articles.* Decisions to publish or not are made by the editors, advised by the peer reviewers.

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Medical Review of North Carolina, Inc. **March 2000**

Comprehensive Coverage For Diabetes Care Management In North Carolina

Many performance measurement systems are currently assessing care delivered to the diabetic population, with fairly consistent indicators of quality care management across systems. Several managed care organizations in North Carolina are participating in the *Managed Care Diabetes Project*, a collaborative effort with Medical Review of North Carolina, Inc. This project examines diabetic processes of care and associated intermediate outcomes within Medicare and Medicaid managed care. Project quality indicators are based on the national Diabetes Quality Improvement Project and on Health Plan Employer and Data Information Set 1999 Comprehensive Diabetes Care measures. MRNC intends to conduct a similar diabetes project in the outpatient, fee-for-service environment beginning in the year 2000.

Highly recommended methods for assessing diabetes control include hemoglobin A1c testing, lipid profiles, screening for nephropathy via urinalysis or microalbuminuria testing, and dilated eye exams. Results of these tests and exams allow informed decision-making regarding management of the disease. As the table on the back illistrates, the care processes being monitored are largely reimbursable by both fee-for-service and managed care public insurance.

Additional benefits are provided in both fee-for-service and managed care settings for diabetic care. Effective July 1998, traditional, fee-for-service Medicare reimburses for physician-prescribed blood glucose testing supplies, therapeutic footwear/inserts (Medicare Part B) and hospital-based diabetic outpatient self-management education (Medicare Part A; primary care physician referral required). Medicare coinsurance and deductibles apply.

Managed care plans tend to be more generous with coverage of diabetic supplies (e.g., test strips, lancets, insulin infusion pumps), and plans offering prescription coverage reimburse for medications such as oral hypoglycemic agents, insulin and syringes. Member copayment amounts for medication vary depending upon generic versus brand prescription. Diabetes disease management programs, which include self-management education and case management, and community health/wellness programs are offered by most health plans in North Carolina.

*See reverse side for table of **Public Insurance Coverage for Recommended Diabetic Care***

PUBLIC INSURANCE COVERAGE FOR RECOMMENDED DIABETIC CARE

		Medicare + Choice HMOs				Medicaid-risk HMOs		
Process Measures	Traditional Medicare	QualChoice Gold/Gold Plus	Partners Medicare Choice	United HealthCare Medicare Complete	WellPath 65	United HealthCare Medicaid-risk product	The Wellness Plan Medicaid-risk product	Carolina Access programs
Hemoglobin A1c testing	reimbursed at 80 of Medicare allowed amount i encoded with diagnosis indicating medical necessity; Medicare coinsurance and deductibles apply	covered in full; no copayment, no frequency limitation i medically necessary (i.e., encoded with diabetes diagnosis)	covered in full; no copayment; no frequency limitation i medically necessary (i.e., encoded with diabetes diagnosis)	covered in full; no copayment no frequency limitation if medically necessary (i.e., encoded with diabetes diagnosis)	covered in full; no copayment; no frequency limitation if medically necessary (i.e., encoded with diabetes diagnosis)	covered in full; no copayment; no frequency limitation	covered in full; no copayment; no frequency limitation	covered in full; no copayment; no frequency limitation
Lipid profile	reimbursed at 80 of Medicare allowed amount i encoded with diagnosis indicating medical necessity; Medicare coinsurance and deductibles apply	covered in full; no copayment; no frequency limitation i medically necessary (i.e., encoded with diabetes diagnosis)	covered in full; no copayment; no frequency limitation i medically necessary (i.e., encoded with diabetes diagnosis)	covered in full; no copayment; no frequency limitation if medically necessary (i.e., encoded with diabetes diagnosis)	covered in full; no copayment; no frequency limitation if medically necessary (i.e., encoded with diabetes diagnosis)	covered in full; no copayment; no frequency limitation	covered in full; no copayment; no frequency limitation	covered in full; no copayment; no frequency limitation
Urinalysis	reimbursed at 80 of Medicare allowed amount i encoded with diagnosis indicating medical necessity; Medicare coinsurance and deductibles apply	covered in full; no copayment; no frequency limitation if medically necessary (i.e., encoded with diabetes diagnosis)	covered in full; no copayment; no frequency limitation if medically necessary (i.e., encoded with diabetes diagnosis)	covered in full; no copayment; no frequency limitation if medically necessary (i.e., encoded with diabetes diagnosis)	covered in full; no copayment; no frequency limitation if medically necessary (i.e., encoded with diabetes diagnosis)	covered in full; no copayment; no frequency limitation	covered in full; no copayment; no frequency limitation	covered in full; no copayment; no frequency limitation
Microalbuminuria testing	reimbursed at 80 of Medicare allowed amount i encoded with diagnosis indicating medical necessity; Medicare coinsurance and deductibles apply	covered in full; no copayment; no frequency limitation i medically necessary (i.e., encoded with diabetes diagnosis)	covered in full; no copayment; no frequency limitation i medically necessary (i.e., encoded with diabetes diagnosis)	covered in full; no copayment; no frequency limitation if medically necessary (i.e., encoded with diabetes diagnosis)	covered in full; no copayment; no frequency limitation if medically necessary (i.e., encoded with diabetes diagnosis)	covered in full; no copayment; no frequency limitation	covered in full; no copayment; no frequency limitation	covered in full; no copayment; no frequency limitation
Dilated eye exam	reimbursed at 80 of Medicare allowed amount i encoded with diagnosis indicating medical necessity; Medicare coinsurance and deductibles apply	PCP* referral required but no pre-authorization required; member responsible for copay	As of 1/1/2000, open access to vision care (no referral needed); member responsible for copay	As of 1/1/2000, open access to vision care (no referral needed); member responsible for copay	PCP* referral required but no pre-authorization required; member responsible for copay	PCP* referral required; annual exam covered for members <25; biennial coverage for members ≥25; no copayments	PCP* referral required; annual exam covered for members < 25; biennial coverage for members ≥25; no copayments	PCP* referral required; annual exam covered for members <25; biennial coverage for members ≥25; no copayments

*PCP denotes Primary Care Physician

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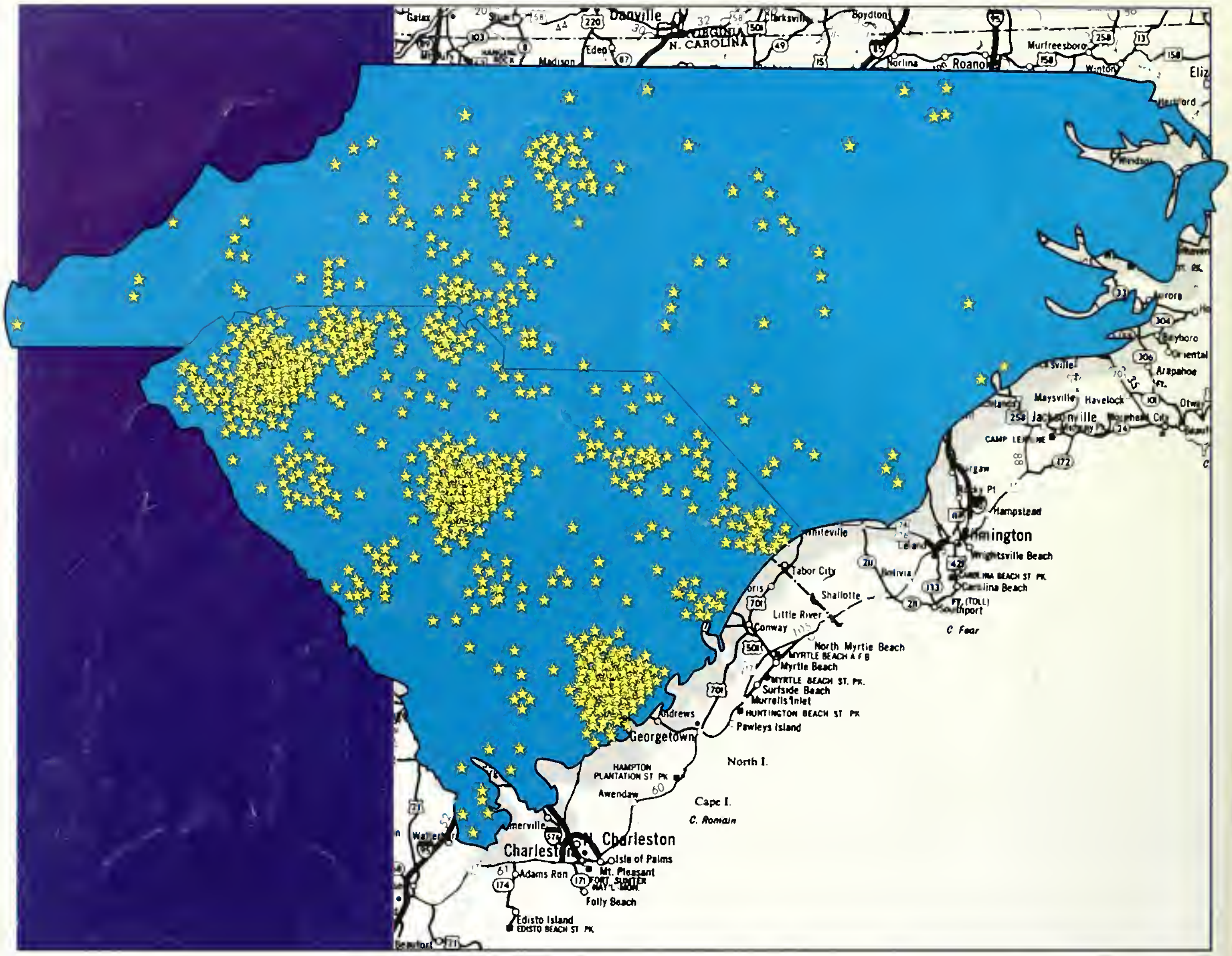

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For Doctors and Their Patients

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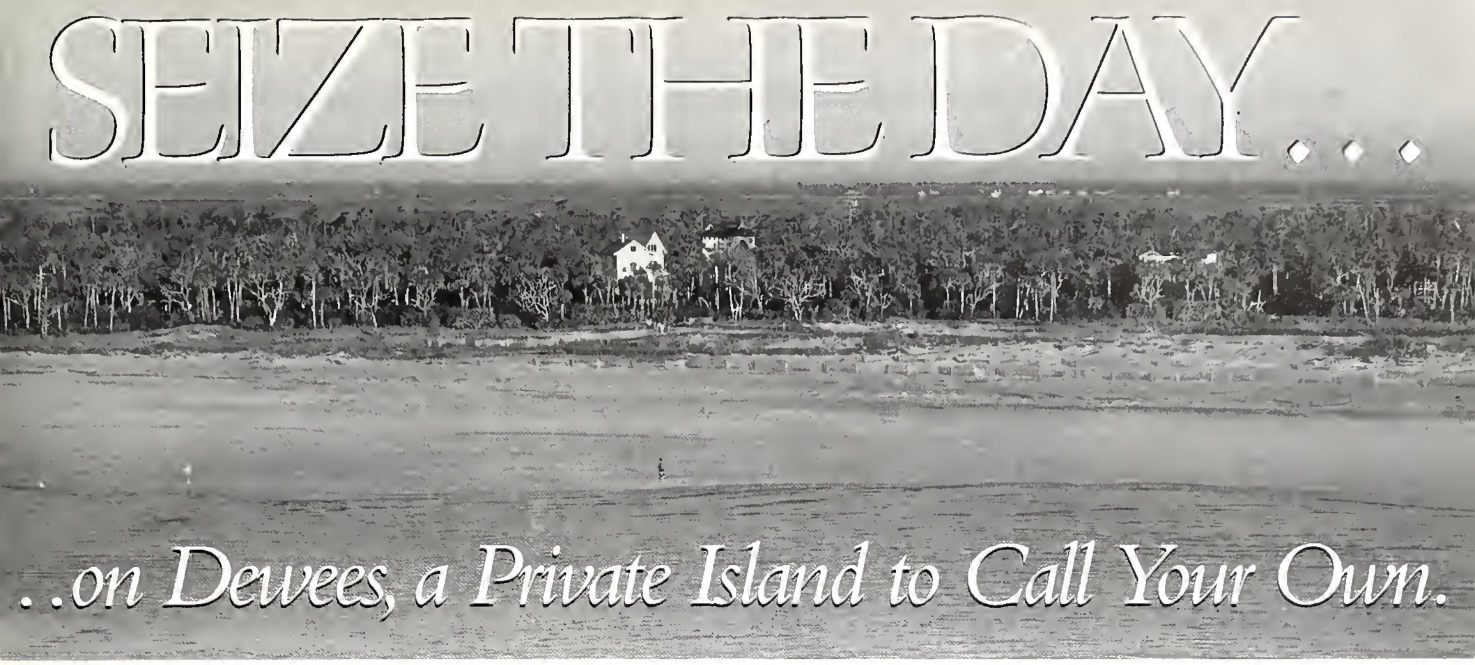

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North Carolina Medical Journal

FOR DOCTORS AND THEIR PATIENTS

May/June 2000, Volume 61, Number 3

Cover: Local, state, and federal agencies are reinforcing preparedness and response capabilities against the modern threat of terrorist attacks through biological agents—and health care professionals must keep pace. Our cover photo, by Herald-Sun photographer Joe Weiss, shows a decontamination team in training. Studies indicate their heavy protective clothing can be a dangerous hindrance as well as a help. Photo reprinted with permission.

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Letters to the Editor

Treating Mental Illness—Then and Now

To the Editor:

I enjoyed the article by Dr. Moira Artigues (NC Med J 2000;61(2):90-4]. After attending medical school during most of WWII, I graduated in December 1947. My formal internship did not begin until July 1948, in St.Louis, Missouri, and as a result two of my classmates and I did a five-month internship at Dorothea Dix Hospital in Raleigh, from January to June 1948. All of the pre-chlorpromazine treatments of mental illness mentioned in the article were part of my experience (although I did not see any mention of intravenous Metrazol convulsive therapy). I attended patients in medical school and at Dix who were subjected to pre-frontal lobotomy. The Medical Director at Dix during this time was analytically trained, and we received instruction in this methodology. I was able to see first hand all the variations of schizophrenia outlined in Dr. Artigues's paper.

Fortunately, I have had good health and am now in my 51st year of general and family practice in a small rural community. Mental illness from simple anxiety to major psychoses has continued to be a part of my practice. I would be quick to agree that modern pharmaceutical agents are more effective when paired with the advice and counsel (psychotherapy) provided by the caring physician. It would be a pleasure to share some of my experiences with psychoactive drugs and "psychotherapy" over these past five decades.

R.H. Shackelford, MD
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Planning the End of Life—Plain Talk Makes Good Sense

To the Editor:

Bruce Blackmon's earthy good sense and eloquent language have combined again to stir our thinking on physician-assisted suicide and euthanasia [NC Med J 2000;61(2):110-1]. This kind, good friend was also my mentor as I struggled to learn the ways of the North Carolina Driver's Licence Medical Review Board. Without his guidance, I could never have reached a point at which to write "Chaos, Alcoholism, and DWI" [NC Med J 1991;52(8):394-7].

It is so critical and often so difficult for young physicians to broach end-of-life plans with older patients. We are often afraid that the elderly patient will feel abandoned to the scrap heap and frightened of our inability to make them live forever. I would like to reassure my younger colleagues that this is not the case. When we are younger, we treat death as a cataclysm to be avoided at all costs. When we are older, we view death as a neighbor whom we will surely visit, perhaps not today, but with each passing day we know the visit is closer. It is comforting to inow that a younger physician and our younger family members understand how we feel.

I have used the following language for an "advanced directive": "If you can fix me, please do! (This opening phrase helps banish the fear of abandonment.) If you can't fix me, please help me die without pain, air hunger, nausea, fear, or thirst. I understand that it may take you a few days to tell whether you can fix me or not."

This language is simple and direct and has almost always been accepted or has led to meaningful discussion that gave me additional insights into the wishes of the patient. The language also provides a readily acceptable framework for patients to discuss end-of-life plans with their families, and it serendipitously relegates Callahan's research imperative to a time in the life cycle for which it is appropriate.[1]

When we have lost our fear of being dead, it is most unkind for our laws and customs to leave us with a fear of the process of dying, a process that may be agonizing indeed.

John R. Dykers, Jr., MD
PO Box 565
Siler City, NC 27344

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[1] Callahan D. Sounding board. N Engl J Med 2000;342(9):654-6.

Guidelines for letters:
Type and double-space all letters. If possible, keep length to under 500 words. We welcome longer letters, and we may publish them as commentaris. We reserve the right to edit and abridge text. Send to: North Carolina Medical Journal, Box 3910, DUMC, Durham, NC 27710. *Fax*: 919/286-9219. *Email*: nash0004@mc.duke.edu. *Internet*: www.ncmedicaljournal.com.

Investigation of Child Abuse Reports—The Law Must Be Served and Our Citizens Protected

To the Editor:

I write in response to the letter from Dr. Nesbit that appeared in your March/April issue [NC Med J 2000;61(2): 113]. While the law does not permit us to discuss matters that relate to informal interviews the Board has with its licensees, it would be inappropriate for us to ignore the inaccurate suggestion Dr. Nesbit makes in his letter that this Board is excessively zealous and that those licensees who, in obedience to the law, report suspected child abuse are at some risk from the Board. This is patently untrue; the Board fully supports the laws of this state, respects those laws, and expects its licensees to obey them.

At the same time, the Board is diligent in its determination to examine with the greatest care all complaints it receives, however rambling or lengthy they may seem to Dr. Nesbit. It treats all complaints equally and considers them seriously. We exist in order to protect the people of this state and must be responsive when any citizen feels concern, however that concern may be expressed. If this process makes Dr. Nesbit uncomfortable, that is unfortunate, but it cannot affect the manner in which the Board addresses its duty to the law and the public.

I also want to assure you and the physicians of this state that the Board only mandates an evaluation of competence when it has serious concerns about a licensee.

Despite the tone of Dr. Nesbit's letter, let me be very clear that there is absolutely no risk of Board action for physicians who report child abuse in good faith pursuant to the provisions of the law.

Andrew W. Watry
Executive Director, North Carolina Medical Board
PO Box 20007
Raleigh, NC 27619

Completing the Circle

To the Editor:

I thought your readers might be interested in a "continuity of care" story—not the continuity of care we normally think about, because I am not really a patient. In 1994, when I had just graduated from the UNC School of Public Health (Health Behavior and Health Education), the NC Medical Journal published a synopsis of my master's paper, "Access to Medications for Low-Income North Carolina Citizens: Without Funds, How Can They Follow Doctor's Orders?" [NC Med J 1994;55(5):173-7]. From this needs assessment, the Senior PHARM*Assist* program was created, and I was hired as its director by a task force of the Durham County Hospital Corporation. We saw our first client in June 1994. Two major North Carolina foundations —The Duke Endowment and The Kate B. Reynolds Charitable Trust—impressed with our thorough planning process and by our added credibility from the article, have given Senior PHARM*Assist* their generous support for five years.

Last month, you published our program evaluation, "A Community-Based Pharmaceutical Care Program for the Elderly Reduces Emergency Room and Hospital Use" [NC Med J 2000;61(2):99-103]—and what perfect timing. As our major "start-up" foundation grants are coming to a predictable end, Senior PHARM*Assist* needs other possible contributors to know how we are making major differences in the lives of older adults who struggle to remain as healthy and independent as possible.

So there you have it! Continuity of care. Senior PHARM*Assist* and the clients we serve are richer because the North Carolina Medical Journal has given serious thought to our work and provided needed "boosters" along the way.

Gina Upchurch, RPh, MPH
Executive Director, Senior PHARM*Assist*
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www.seniorpharmassist.org

From the Editor:

The authors report that the Robert Wood Johnson Foundation is also currently featuring the recent article as a link on one of its program websites: www.volunteersinhealthcare.org.

Big Media and NCMJ

To the Editor:

May I request a copy of the recent article by Dr. Kandaswamy Jayaraj [NC Med J 1999;60(6):340-5]? I am researching a show on aging, and this article would be very useful to me. Many thanks.

Jonathan Lynch
Medical News
CNN

Engineering Students Motivated by "Gripping" Article

To the Editor:

I am writing in an attempt to obtain a clean, readable copy of the article by Margareta Claesson, "I live by the color of thin plastic strips" [NC Med J 1991;52(11): 571-3]. I have been using this article for a couple of years as assigned reading in a new introductory course on biomedical engineering. It is quite a gripping personal story, and is very effective at stimulating interest and motivation in students to study the physiology and treatment of diabetes.

The copy I have was given to me by a colleague. It was a worn photocopy then, and has deteriorated since. Is it possible to obtain a good reprint of the article, and may I have permission to photocopy it for students?

Richard C. Haskell
Professor of Physics
Harvey Mudd College
241 East 12th Street
Claremont, CA 91711

From the Editor:

Photocopies are sent, and permission is of course granted–happily–for such productive use of *Journal* articles by our far-flung readers.

Bottled vs. Tap Water—How About Fluoride and Iodine?

To the Editor:

I enjoyed the excellent article, "Assuring access to dental care for low-income families in North Carolina" [Silberman et al. NC Med J 2000;61(2):95-8]. Most impressive to me was what I already knew–but was again impressed by in reading the article: that fluoridation of water has resulted in such a decrease in the number of cavities. Dental cavities are a great, painful process in childhood, as I came to know through my own childhood before the fluoridation of water.

What really worries me is that we see young people and old people drinking these bottled waters, which as far as I know contain no fluoride or iodine. They are apparently rejecting the best water supply in the world, which I consider to be very healthy in our state, and paying a lot of money for bottled water from springs. I wonder if there any data about fluoride and iodine levels in any bottled water that went by us. If not, those people who drink only those things will have more cavities in their teeth and more thyroid trouble.

Eben Alexander, Jr., MD
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Ephraims of the World—Watch Out!

To the Editor:

I have always been fascinated with Ephraim McDowell [McMahon C. Ephraim McDowell, Jane Todd Crawford, and the origins of oophorectomy. NC Med J 2000;61(1):401-2], mainly because my father was. I have seen in my father's handwriting the inscription on a plaque at Ephraim's birthplace, "Ephraim McDowell, who removed the first abdominal tumor in America, was born here. Killed by the Indians."

There is a possible connection with another Ephraim—Ephraim Liles, who mistakenly shot an Indian chief's son while hunting deer in Virginia. He escaped by night in a canoe down the Yadkin-Pee Dee rivers to Anson County (first white man in the county) about 1753. The Indians vowed to kill *all* white men named Ephraim. They thought they shot him, but missed. They did get his son (also named Ephraim) later, in South Carolina. Pap always felt badly that the good doctor died not knowing what hit him!

I would bet a "new dollar" that Jane Todd Crawford had a cyst or *benign* tumor.

Richard V. Liles, Jr., MD
505 Pee Dee Avenue
Albemarle, NC 28001

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Correction:

In the article on the Senior PHARMAssist program in our last issue [Catellier et al. A community-based pharmaceutical care program for the elderly reduces emergency room and hospital use. NC Med J 2000;61(2):99-103], Table 1 on p. 100 contains an error: Impaired ADL 0 (none) was reported for 32% of the sample at 12 months. It should have read 81% at 12 months.

This table appears correctly with the article in the on-line *Journal*.

The Hippocratic Oath

Searching for an Ideal

The winning entry in the 2000 History of Medicine Student Essay Competition, sponsored by the Brody Society for the History of Medical Sciences at Duke University Medical Center.

Elizabeth Griffiths

The technological advances of medicine have provided doctors with many useful diagnostic tools. As a result, we can treat disease with unprecedented success and, as in the case of smallpox, even completely eliminate diseases that used to cause enormous morbidity and mortality. Yet, despite these technological advances, the most famous document of western medicine remains a 2500-year-old piece of prose, written originally in Ionian Greek, and providing not a single bit of technological expertise. This document is, of course, the Hippocratic Oath, and we, who have progressed so far, still cling tenaciously to it. In this essay I will endeavor to examine three things: where the Oath comes from and who wrote it; what the Oath says; and why physicians revere the Hippocratic Oath.

Hippocrates of Cos

Hippocrates the physician was born between 460 and 450 BC on the island of Cos, part of the Greek colony of Ionia in the eastern Aegean Sea. We know few details of his life, but it is well documented that Hippocrates was a genuine person who taught medicine to his sons and sold his services as a teacher to others outside his family.[1,2] Jacques Jouanna[2] details ancient accounts of Hippocrates, including some by Plato, Aristotle and Aristophanes, which substantiate his existence as a physician. He is thought to have died around 370 BC.[1,2,3]

In his time, Hippocrates was known as the Asclepiad of Cos. The name *Asclepiad* was the general denotation of a physician, in reference to Asclepius, the god of healing in the classical period. In the case of Hippocrates, the name directly indicates his ancestry: he was from a noble family directly descended from Asclepius, a prince at the time of the Trojan War. Varying accounts put Hippocrates as his 17th, 18th, or 19th descendent.[2] Certainly, Hippocrates was not the first physician in this family, nor the first to distinguish himself in practice.

Ancient Greek medicine was a profession handed down from father to son. Asclepius was the first, and taught his sons, Podalirius and Machaon, who passed the art on to the male ancestors of Hippocrates. The sons of Asclepius fought in the Trojan War where Machaon was killed. After the war, Podalirius sidetracked to Asia Minor where he saved the king of Caria and his daughter from illness. In gratitude, the king rewarded Podalirius with his daughter's hand in marriage. Podalirius remained in Caria, and his descendents split into two branches, one of which moved to Cos and the other to the peninsula across from it, Cnidus. Both settlements gave rise to 'schools' of medicine, but the former was made famous by Hippocrates.[2] Hippocrates probably received his training on the island of Cos, chiefly from his family and, perhaps later, in apprenticeship to physicians and philosophers.[2]

Ancient medicine was not the organized profession it is now. There were no qualifying exams and certainly no peer review boards. Medical care was often associated with religious practice, and one of the common forms of treatment involved "incubation" at a temple of Asclepius, who had come to be venerated as the god of medicine. Treatment at the temples was chiefly sought by members of the lower classes or by those suffering from incurable disease.[3] Independent physicians, whose training was more or less medical, treated the wealthier inhabitants, but certainly not all those who called themselves "physician" were in the mold of Hippocrates. In fact, the vast majority had little or no real medical training. The only requirement for practice was to have an "office" and a sign to hang up. This laxity was the basis of a complaint voiced repeatedly in the Hippocratic

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Corpus. For example, the *Decorum* states: "These . . . men . . . go around cities, and gather a crowd about them, deceiving it with cheap vulgarity. You should mark them by their dress. . . they should be much more shunned and hated by those who behold them. . ."[4] Since these practitioners were not licensed, they had to prove themselves in other ways, chiefly by rhetoric and theatrics. Since medical practitioners at the time were well paid, and since there was no legal penalty for malpractice, a great many citizens of ancient Greece apparently tried their hand at medicine.

In addition to the true charlatans, a number of other people offered medically related services. There were midwives and purveyors of various drugs and poisons who sold their wares with no questions asked.[2,5] It is likely that, in this highly competitive and unregulated environment, Hippocratic physicians were eager to set themselves apart on the basis of their moral and ethical philosophy, not to mention superior medical training. In this context the Oath can be seen as an attempt at professional regulation and standardization, virtues clearly lacking among other types of practitioners.

The Oath Of Hippocrates

The Oath (Appendix 1) and about 60 other documents form a collection known as the Hippocratic Corpus. It was compiled in Alexandria around 280 BC, and although Hippocrates probably contributed, it almost certainly represents the work of many other authors during the period between 420-350 BC.[1] Regardless of its true authorship, the Hippocratic Corpus presents a particular theory of medicine, one that gave rise to the idea of medicine as a science of observation distinct from religion and superstition. With the emergence of the Hippocratic physician we had for the first time a healer who was distinct from the priest, who believed in natural rather than supernatural causes of disease. Hippocratic physicians, although certainly not areligious, sought cures and explanations for disease through observation and reason.[3,7] This was an entirely novel concept in medicine, and it is for this reason that we view the Hippocratic Corpus, and indeed Hippocrates himself, as the forerunner of modern medicine.

The Oath lays down a basis for the moral and ethical conduct of physicians, but in its time it was hardly widely accepted. The tenets exhorting physicians not to "give a drug that is deadly to anyone if asked [for it], nor . . .suggest the way to such a counsel. And likewise . . . not give a woman a destructive pessary" refer to practices that were neither illegal nor uncommon at the time.[8] Far from representing the prevailing view, the ideas in the Oath stem almost exclusively from the Pythagorean School of philosophy, a school whose members were few and whose philosophies were not widely practiced.[8-10] The Pythagoreans espoused equality between men and women, were strongly opposed to violence and injustice, and refused to discriminate on the basis of social status. In addition, they opposed abortion and euthanasia and believed strongly in strict sexual mores and the importance of a father-son relationship between student and teacher.[10] These ideas predominate in the Oath, where, perhaps for the first time in history, medicine assumes a philosophical rather than a religious foundation. The injunction against "cutting for the stone" may stem from the Pythagorean dislike of surgery, ranked as the lowest of healing arts because of its association with knives and thus with violence.

The Oath, then, designates what a physician should be. It is not the only arbiter; the *Law*, the *Physician*, *Decorum*, and many other Hippocratic writings describe how physicians should look and comport themselves, and the image to be presented to patients.[4] The Oath addresses part (the moral and ethical aspects) of a global ideal. The Hippocratic physician was expected to be a complete man, not a hodgepodge of distinct and separate parts. This view is analogous to the Hippocratic vision of illness, which interpreted disease not in the context of diseased organs, but as an insult upon a psychosomatic being universally affected by the disturbance to his natural state.[7]

The Legacy and Impact of the Oath

From its inception, people—particularly physicians—have tried to achieve the goals espoused in the Oath. It has never been universally recited, but it has been preserved relatively intact for nearly 2500 years.[5,8] Some Christians, agreeing with Pythagorean beliefs, adopted an altered version of the Oath (Appendix 2). The Arabs also adopted the Oath, preserving an accurate version, whose only alteration lies in the replacement of Greek deities with a call upon God or Allah (Appendix 3).[5]

What impulse has maintained this oath, when there are many others to choose from?[8,10] Perhaps the Oath, harsh and simply stated as it is, appeals at a deep level to a profession whose fundamental attraction is love of human life. It provides a black and white gauge for behavior - perhaps particularly attractive to a society that has become so secular and in which strongly codified religious beliefs are no longer the norm.

The Oath is important not because it is unique but because it alone, among many current variations and alternatives, does not admit excuses. It sharply divides the healer from the killer (even inadvertent ones). Margaret Mead said of the Oath, "Throughout the primitive world the doctor and the sorcerer tended to be the same person. He with the power to kill had the power to cure . . . With the Greeks the distinction was made clear."[5] Viewing the Oath as moral high ground has been popular with many. In his treatise on the Oath,[5] the Rev. Dr. Nigel Cameron emphasizes its role as a covenant. He contends that we have lately strayed from the ideals of the Oath and urges us to adhere more stringently to its original form. He says the oath is "philanthropic medicine based on the sanctity of life" - which it may be - but despite its moral superiority, it has never become a universal credo.[8]

Cameron believes that medical practitioners today have substituted "relief of suffering" for healing. He correctly points out that, "the Oath says nothing explicit about the calling of the physician to relieve the suffering of his patients" because other practitioners in Hippocrates' day had the job of relieving suffering.[5] In repudiating the idea that the doctor's job is to relieve pain at any cost, and furthermore in forbidding physicians from the practice of both abortion and suicide/euthanasia, Hippocratic medicine allied itself solely with healing, foreswearing absolutely the taking of life. Cameron feels that the modern move towards "relief of suffering" is diametrically opposed to the most fundamental of Hippocratic tenets ("First do no harm"). He claims that this betrayal of Hippocratic ideals represents the first step in reincarnating the modern physician in the image of Margaret Mead's healer/killer. In contrast, Jouanna[2] suggests the Hippocratic precept may have been designed to distinguish physicians morally from common midwives and less reputable medical personnel.

The Oath was not commonly recited until 1558 when the University of Jena in Germany began to have students agree to "everything that Hippocrates demands in his Oath."[8] After that it became more widely adopted - in France in the aftermath of the French Revolution, and then in Austria; but the most strident calls have come from the US. The first neo-Hippocratic movement in North America occurred in the late 19th century, prompted by medically trained practitioners. A second wave of enthusiasm occurred after World War II, largely prompted by medical students.[8] The demand for oath-swearing may have represented a reaction to changes in the social circumstances surrounding medicine. In the late 19th century this country had many alternatives to traditional medicine. Midwives were particularly popular, and in the West, a shortage of trained medical personnel created a scenario not unlike that of ancient Greece.[12] Perhaps the resurgence in Oath-taking was motivated by competition from non-medical sectors.

In 1993 R. Orr, MD, and N. Pang, MD, found that 98% of North American medical schools responding to a survey said that their students swore an oath, most of which had at least some relation to the Hippocratic Oath.[13] The contemporary move towards the recitation of an oath may reflect our more secular society, but it may also be a response to the horrific actions of Nazi doctors during WW II. Certainly the foundation of the World Medical Association in 1948, and the Declaration of Geneva (Appendix 4) were based on this.[10] Perhaps the belief of Nazi doctors that they were acting in accordance with the Hippocratic Oath,[14] and in truth the Holocaust in its entirety, suggests that something was wrong with the society that produced such abhorrent acts. It seems that, although we strive to live according to the Oath, it does not guarantee that we will not abuse our position as doctors.

A more recent concern was expressed by Paul McHugh in *Hippocrates à la mode*.[11] He traces the evolution of the Hippocratic Oath from its original form to those currently recited by graduates at Johns Hopkins and Harvard. He criticizes the alteration of a declaration that required absolute commitment to patients and to other members of the profession into one which is "self-serving and jejune . . . a false step at a time of great vulnerability for medicine."[11] The changes introduced into modern oaths are indeed substantial, and they do water down the Oath to the point of banality, but what choice is there? The original Oath no longer seems entirely appropriate, as when it prohibits us from "cutting for the stone," with which no future surgeon could agree. In addition, its vows against euthanasia and abortion no longer seem so black and white. Medical science has created circumstances unimagined in the time of Hippocrates. The Hippocratic Oath never envisioned a time of amniocentesis, mechanical ventilation, or tube feeding.

There are many reasons why we might want to return to the Hippocratic Oath, but despite its seeming order and clarity, it remains a superficial document for modern medicine. John Ellard eloquently argues that "there are no ethical principles from which particular rules may be deduced . . . there are no rules which are valid universally. . . there are no infallible authorities . . . and there is no prospect of achieving any of these."[14] This does not mean, however, that we cannot create a set of suggestions - not absolutes but guides to sound judgment and open discourse. The Hippocratic Oath is - always has been - a goal, one which can never be entirely achieved but which we preserve because it speaks to something fundamental in us all. It appeals to our desire for black and white answers in a profession overrun by shades of gray. Perhaps Hippocrates had the best answer after all: "Where there is love of man, there is also love of the art." Maybe this, and the Oath as goal rather than a standard, can be enough.[4]

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Appendix 1. The Hippocratic Oath

I swear by Apollo the physician and by Asclepius, and Health, and by Panacea, and by all the gods and goddesses, making them judge, to bring the following oath and written covenant to fulfillment in accordance to my ability and judgment:

I will keep this Oath and this stipulation - to reckon him who taught me this Art equally dear to me as my parents, to share my substance with him, and relieve his necessities if required; to look upon his offspring in the same footing as my own brothers, and to teach them this art, if they shall wish to learn it, without fee or stipulation; and that by precept, lecture, and every other mode of instruction, I will impart a knowledge of the Art to my own sons, and those of my teachers, and to disciples bound by a stipulation and oath according to the law of medicine, but to none others.

I will follow that system of regimen which, according to my ability and judgement, I consider for the benefit of my patients, and abstain from whatever is deleterious and mischievous.

I will give no deadly medicine to any one if asked, nor suggest any such counsel; and in like manner I will not give to a woman a pessary to produce abortion. With purity and with holiness I will pass my life and practice my Art.

I will not cut persons laboring under the stone, but will leave this to be done by men who are practitioners of this work. Into whatever houses I enter, I will go into them for the benefit of the sick, and will abstain from every voluntary act of mischief and corruption; and, further, from the seduction of females or males, of freemen and slaves. Whatever, in connection with my professional service, or not in connection with it, I see or hear, in the life of men, which ought not to be spoken of abroad,

I will not divulge, as reckoning that all such should be kept secret. While I continue to keep this Oath unviolated, may it be granted to me to enjoy life and the practice of the art, respected by all men, in all times. But should I trespass and violate this Oath, may the reverse be my lot.[6]

Appendix 2. A Christian Version of the Oath

Blessed be God the Father of our Lord Jesus Christ, who is blessed for ever and ever; I lie not.

I will bring no stain upon the learning of the medical art. Neither will I give poison to anybody though asked to do so, nor will I suggest such a plan. Similarly I will not give treatment to women to cause abortion, neither from above nor from below. But I will teach this art, to those who require to learn it, without grudging and without an indenture. I will use treatment to help the sick according to my ability and judgement. And in purity and holiness I will guard my art. Into whatsoever houses I enter, I will do so to help the sick, keeping myself free from all wrong-doing, intentional and unintentional, tending to death or to injury, and from fornication with bond or free, man or woman. Whatsoever in the course of practice I see or hear (or outside my practice in social intercourse) that ought not to be published abroad, I will not divulge, but consider such things to be holy secrets. Now if I keep this oath and break it not, may God be my helper in my life and art, and may I be honored among men for all time. If I keep faith, well; but if I forswear myself may the opposite befall me.[15]

Appendix 3. Arabic Version of the Oath

I swear by god, Lord of life and death, the Grantor of health and Creator of cure and every remedy, and I swear by Asclepias, and I swear by all men and women companions of God, that I fulfill this oath and this obligation:

That I regard my teacher of this profession as equivalent to my parents, share with him my livelihood and, should he be in need of money, I would help hi and provide him of my money. As to his progeny, I shall regard them as my brothers. I will teach them this profession—should they need to learn it—without any fee or obligation. I will accept as partners my children and the children of my master, and students who have accepted this written obligation and swore by this medical code of commandments, sciences and other aspects of the profession, and I shall not do the same with others.

I will seek in all counsels, with my power, the benefit of patients. As to things that are harmful and demeaning to them, I shall forbid them according to my judgement. I shall not give, if asked, a lethal medicine, nor would I advise something of the like. Likewise, I will not provide women pessaries that evacuate fetuses. I shall be guided in my counsel and profession by wisdom and purity. I shall not cut for those who have a stone in their bladder, but leave this to those who are skilled in this work. Each house I enter, I will enter it for the benefit of patients, and with a state detached from all baseness, cruelty and vice with women and men, free or slave. As to things I observe or hear during the treatment of patients or outside the time of their treatment about the behaviour of people which should not be divulged, I shall refrain from divulging them and will ensure that such things are not talked about.

To the one who keeps this oath and does not alter anything in it, may he enjoy his health and profession under the most favorable and beautiful circumstances, and may he be praised by all people at all times. May the opposite happen to the one who transgresses it.[16]

Appendix 4. Declaration of Geneva, 1968

At the time of being admitted as a member of the medical profession: I solemnly pledge myself to consecrate my life to the service of humanity; I will give to my teachers the respect and gratitude which is their due; I will practice my profession with conscience and dignity; The health of my patient will be my first consideration; I will respect the secrets which are confided in me, even after the patient has died I will maintain by all the means in my power, the honor and the noble traditions of the medical profession; My colleagues will be my brothers; I will not permit considerations of religion, nationality, race, party politics or social standing to intervene between my duty and my patient; I will maintain the utmost respect for human life from the time of conception; even under threat, I will not use my medical knowledge contrary to the laws of humanity. I make these promises solemnly, freely and upon my honor.[17]

Ancient Wisdom for Modern Medicine

The Tradition of Judaism

Maimonides Graduation Ceremony Address, Duke University School of Medicine, May 15, 1999

James A. Tulsky, MD

In the Talmud, the codification of Jewish oral law, the Rabbis wrote: "*Whosoever visits the sick must not sit upon the bed, or on a stool or a chair, but must reverently robe himself and sit upon the ground, because the Divine Presence rests above an invalid's bed.*"[1] This singular dictum embodies much of what the Jewish tradition can teach physicians today. I offer for your reflection three themes prompted by that text; written on a 3x5 note card, they could fit in a white coat pocket, to go with you as you enter the profession.

Awe

Imagine how we would behave if every time we walked into a patient's room we remembered the divine presence hovering over the bed. We would be in wonderment, we would be a bit afraid, and we would be ultimately respectful. We might not have ten people standing around the bed, speaking as if the patient were not there. We might stoop, might get down on our knees, would at least pull up a chair to be at the patient's level.

Abraham Joshua Heschel, one of the foremost Jewish scholars of this century wrote: "*The body is a sanctuary, the doctor is a priest.*"[2] The notion of the body as a temple inspires great respect. How should we conduct ourselves in a sanctuary? With reverence. With deference. We would walk and talk softly. Those of you about to begin an internship, to perform procedures, to assist in the operating room need to remember the sanctuary. Be mindful of its exquisite detail, of its walls and rooms and entryways . . . and honor it.

Awe sometimes comes when you least expect. Two years ago I took care of a man whose lung cancer had spread to his brain. He was in his young 50s and had a 14-year-old son. He was terminally ill and suffering deeply, not so much from the physical symptoms (which, thankfully we had under fairly good control) but from an overwhelming sense of looming loss. Neither he nor his wife knew how to handle this, and their visits to the office were laden with anxiety, fear and desperation. They had a lot of practical concerns – they were financially on the edge and the illness was making them poorer. Their son was having trouble in school, and with the law. My patient knew that he would die soon without being able to shepherd his son through these difficulties. His wife was overwhelmed by even trying to imagine life without him. Then something changed. I'm really not sure what happened, what I said (if anything) or did, but suddenly each began to tell the other the story of their love. In my presence, they shared how they had met twenty years earlier while working in the same factory, began dating, fell in love, had a child, and shared a life together. They were not speaking to me, although I was present. They were sharing a very private moment together. And with that sharing, all the anxiety and fear and desperation cleared – at least for those moments. For me, there was no response except awe. I was cloaked in reverence and sitting on the floor. It was my privilege just to be there.

Honor and cherish the awe that medicine and patients inspire in us every day.

Obligation

For many, the second and perhaps the dominant theme of the Jewish tradition is obligation. The Talmud says that the visitor to the sick *must* not sit upon the bed, but *must* reverently robe himself. The practice of medicine is full of uncertainty. "Must" language is unusual in medicine because there is an exception to almost every rule. But our tradition speaks with considerable authority about some things.

The Judaic perspective on the role of the doctor and the

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Prayer of the Physician

Exalted God:

Before I begin the holy work of healing the creations of your hands, I place my entreaty before the throne of glory that you grant strength of spirit and fortitude to faithfully execute my work. Let not desire for wealth or benefit blind me from seeing truth. Deem me worthy of seeing in the sufferer who seeks my advice a person—neither rich nor poor. Friend or foe, good or bad, of someone in distress, show me only the person. If doctors wiser than I seek to help me understand, grant me the desire to learn from them, for the knowledge of healing is boundless. But when fools deride me, give me fortitude! Let my love for my profession strengthen my resolve to withstand the derision even of people of high station. Illuminate the way for me, for any lapse in my knowledge can bring illness and death upon your creations. I beseech you, merciful and gracious God, strengthen me in body and soul, and instill within me a perfect spirit.

patient differs greatly from the prevailing American ethos. Our country was founded on Libertarian notions: "Give me liberty or give me death!" "Don't tread on me!" "Live free or die!" Even in the face of repeated episodes of senseless violence, many of our countrymen persist in advocating the unrestricted right to keep and bear arms. Medicine is hardly immune from the pervasive influence of such language. As a result, in modern medical ethics autonomy is, arguably, the dominant principle. In practice, this sentiment is expressed as rights. We talk of a Patient Bill of Rights; the right to refuse treatment; the right to choice; the right to die. Doctors also speak about rights (the right to refuse to administer futile treatments; the right to practice medicine without interference by government or third parties; even the right to choose whom we treat). Interestingly, I'm not sure that anywhere does Jewish thought speak of rights, at least with respect to

A Benign Historical Hoax

Moses Maimonides (1135 -1204) was a renowned physician, author, and Biblical and Talmudic scholar. (His name was Moses Ben Maimon. Ben means "the son of" and thus Moses, the son of Maimon. Among Jews, his name is often converted to an acronym thus: RAbbi Moses Ben MAimoN or "the RAMBAM". The name "Maimonides" is Greek.) The prayer attributed to him, which appears on the walls of innumerable physicians' offices, is a lofty and beautiful prayer. It also is one of medicine's long-standing historical hoaxes.

The prayer first appeared in a German periodical in 1783 and was probably written by Dr. Markus Herz (1747-1802), a celebrated Berlin physician. Its erroneous attribution to Maimonides seems to have been either a mistake or a hoax by a late 18th- or early 19th-century newspaper editor. The inaccuracy, in any case, has been perpetuated.

While much has been written about this hoax and the true authorship, one of my favorite exchanges on the subject dates from 1917, when Sir William Osler wrote to Joseph H. Hertz, Chief Rabbi of the British Empire, with an inquiry concerning the authorship of the prayer. Hertz responded:

"Dear Sir William,

"Some 2 years ago you inquired of me as to the 'Physician's Prayer' attributed to Maimonides. I can now give you the following information on the subject.

"The prayer is the production of Dr. Markus Herz (1747-1802), a friend and pupil of Immanuel Kant and of Moses Mendelssohn [grandfather of the composer Felix Mendelssohn—Ed.]. He was physician to the Jewish Hospital in Berlin. The prayer was composed by him in the German language and was published in a Hebrew translation in the Periodical Ha-Meassef. The current English version seems to be from this Hebrew translation and first appeared in the London paper "Voice of Jacob" on the 24th December, 1841.

"Sincerely yours,
J.H. Hertz"

The prayer contains moral and ethical standards to direct the physician's conduct. It is, however, of modern and not medieval origin.

—*Edward C. Halperin, Deputy Editor*

healing. Rather, the tradition espouses obligations. Patients have an obligation to seek healing. Physicians have an obligation to heal. For the physician, that obligation reaches the level of a *mitzvah*, a commandment. It is not permissive, not something that *may* be done. It is something that *must* be done.

According to Jewish tradition, with the medical degree come obligations. Graduates assume a collection of "musts" simply by acquiring an MD following their name. The next time you fly on an airplane and the flight attendant asks on the overhead page if there is a physician on board to help a sick passenger, you have no choice but to press the call button. You have acquired unique obligations. Some patients will challenge your authority. Some patients will make you angry. Some patients will seem frankly abusive. For all the many patients that you will love, some you will simply dislike. And yet, your obligation is to find a way to make every relationship work.

Recently, a friend told me a story that exemplifies the tension that exists in American medicine between rights and obligations. Her parents are elderly and have mild to moderately severe medical problems. Both have been seeing the same physician for 25 years. Her mother saw the doctor only sporadically, when she felt ill; her father saw him more regularly for treatment of hypertension. About six months ago, the doctor referred her father to another physician for treatment of his hypertension. The father didn't really understand that the doctor was, in fact, transferring his care, not just sending him to a specialist for a consultation. Then, a few weeks later my friend's mother called to make an appointment for an annual check-up. She was told that the doctor would no longer be seeing her. His office staff said that since the doctor had transferred her husband's care to another physician, he would need to transfer her care as well. He recommended that she see the husband's new doctor. There was no explanation as to why the doctor would no longer see this couple, except that my friend's father could be "difficult." I really don't know the details of what happened here. Possibly, my friend's father did not follow the prescribed treatment, or was too independent minded about his care. Possibly, their insurance coverage was considered inadequate. Certainly, there was no truly egregious behavior leading to dissolution of the doctor-patient contract. But the details are irrelevant. What is important is the reaction of these elderly patients. They were devastated. They felt rejected and hurt. They had seen one physician for 25 years, and now, getting older and more in need of care, they had to develop new relationships with a new doctor. They wondered what was wrong with them that their doctor would do this.

According to law and the Code of the Ethics of the American Medical Association "physicians are free to choose whom they will serve."[3] This physician had every *right* to act as he did, as long as he ensured adequate follow-up. When questioned, the physician and his office staff defended their right to stop care. If sued, I know he would win in court. But, in exercising his right, this doctor abandoned his obligations to an elderly man and woman. I don't like what happened here. The outcome was consistent with the law and prevailing views of medical ethics, but I draw on another source for guidance. The Jewish community of traditions says that certain obligations trump rights. Sometimes we are bound to duty more than to our entitlements.

Modesty

The dictum that led off this essay said that the visitor at the bedside should sit lower than the patient. Perhaps this is a reminder of how the power relationship ought to be established between physician and patient. We tend to look down on patients, literally and figuratively. I think there is a lot to learn when we begin looking up to those for whom we care.

The dominant view in Rabbinic literature is that healing is a partnership between man and God. Doctors cannot heal alone. In fact, the medications, procedures and other interventions of medicine are seen as the work of God on earth. Since doctors are not the ultimate agents of healing, they (we) cannot take credit for healing. This modesty is embodied in the Maimonides prayer of the physician. "Deem me worthy," the physician asks. "Grant me the desire to learn from doctors wiser than me." Contrast this with the Hippocratic oath:: "I will prescribe regimen for the good of my patients according to my ability and my judgment . . . May I enjoy my life and practice my art, respected by all men and in all times." There is much value in the Hippocratic corpus. Unfortunately, modesty is a virtue lost in those writings.

The Talmud contains the following enigmatic statement: "*The best of physicians are destined for hell.*"[4] Many interpretations have been offered for this statement. Rashi, a medieval French Jewish commentator, suggested that it is a censure of the physician's tendency to disavow reliance upon God, the partner in healing. The religion chastises physicians who are arrogant enough to believe that they heal on their own.[5] A more modern commentator says it means that physicians who consider themselves the best of physicians are destined to reside in hell for the sins of pride and murder.[5] Pride meaning the failure of modesty; murder meaning that haughty physicians who fail to consult others thereby harm, even kill their patients.

Perhaps this commentary is also a reminder to take serious note of the roles of other professionals who will assist us in easing the patient's suffering. Nurses, chaplains, social workers and others all hold place at the bedside. They all sit on the floor with you, the physician. Notice, too, that the quote speaks of "he who visits the sick." It does not differentiate between doctor, nurse and layperson. Some might ask: "Can't I claim credit for what I do? For my hard work and the complex knowledge and skill I bring to my to my patients?" I'll respond with the words (again) of Abraham Joshua Heschel: "*Medicine is prayer in the form of a deed.*"[2]

Prayer is devotion. Prayer is meditation. Prayer is praise. Prayer is plea. We don't take credit for our prayers. We are not proud of our prayers. We don't talk about our prayers to others. We pray because of awe, obligation and need. Thus, our prayers ought to be enveloped in modesty. If medicine is prayer in the form of a deed, then our practice of medicine ought to be enveloped in modesty.

In a few moments we will recite the Prayer of a Jewish Physician. Listen for the awe. Listen for the obligation. And listen for the modesty. All of these are woven through the fabric of this prayer. And, in the future, as you sit on the floor at the side of your patients, robe yourselves reverentially in that fabric and bring a piece of your tradition to the bedside. You are blessed to be physicians. Seek and rejoice in the awe, fulfill the obligation, and practice in modesty.

Acknowledgment

I am indebted to Rabbi Steven Sager for his guiding spirit in my explorations of faith and healing.

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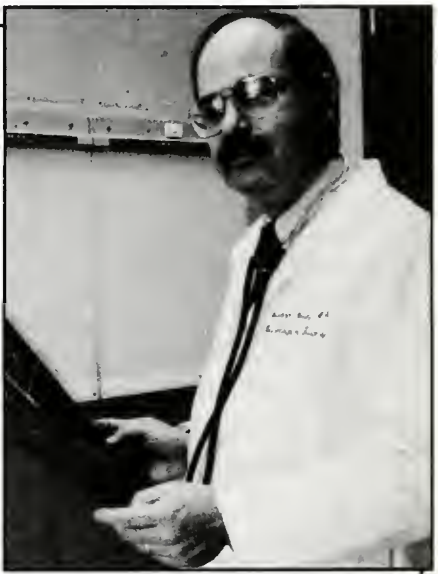

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Early Women Physicians of Eastern North Carolina

Lula Disosway, MD, Malene Grant Irons, MD, and Isa Grant, MD

Jessica Lee Mega, Lesly Tamarin Mega, MD, and Cynthia Yvonne King, MD

History can serve "as an organizing tool, as a vehicle for gaining social and political perspective, as a source of important role models, and as a goad for reform."[1] This sentiment led us to explore the lives of early women physicians in eastern North Carolina. Who were these early pioneers? What were their struggles, their successes?

We reviewed the literature concerning women physicians in eastern North Carolina and examined medical society records and other historical collections, focusing our study on women who graduated from medical school during the early 1900s. A questionnaire was devised to guide in-depth oral interviews with the surviving physicians or their families or both. We explored each physician's lifestyle, accomplishments, disappointments, and support systems. This paper introduces three of the women studied. Each entered the medical profession at a time when women accounted for only 4-6% of physicians in the United States, and faced varying degrees of gender discrimination - including being denied entry into medical schools or acceptance on hospital staffs. All of the "trailblazing tarheels" in our study demonstrated the strength to overcome numerous obstacles. Because of spirit and determination like theirs, women are no longer a struggling minority in medical school classes.

Lula Marjorie Disosway, MD (1897 - 1973)

In the coastal town of New Bern, Reginald and Lula Stanley Disosway greeted the arrival of Lula Marjorie Disosway on January 9, 1897. She was healthy during her early years, but at age five young Lula contracted meningitis. Meningitis has always been a formidable medical challenge, and Lula's physicians assumed that she would die. Lula's parents prayed continuously at their daughter's bedside, and miraculously, despite the ominous prognosis, Lula recovered and developed into an active, energetic youth.

Lula dreamed originally of becoming a missionary evangelist, but she abandoned this notion during her senior year in college after reading in Dr. David Livingstone's memoir of Africa, that "to heal the body is to open an avenue to the soul." Inspired by this statement, Lula decided to become a doctor - but first she had to complete an earlier obligation to teach at Moyock High School. After teaching and serving as principal at Moyock, Lula Disosway took pre-medical courses at Johns Hopkins University, then entered the Women's Medical College of Pennsylvania in 1921. In 1925, she became the first woman intern at James Walker Hospital in Wilmington, North Carolina, a remarkable appointment, because 17 states rejected women interns outright, and most opportunities for women were found in Pennsylvania, New York, and California—not North Carolina.

When her internship was completed, the National Episcopal Church encouraged Dr. Disosway to sail to Shanghai, China, in 1926. She learned Chinese at Sochow University and was assigned to head a 150-bed hospital, with only one other doctor to assist her. The burden of responsibility forced Dr. Disosway to become proficient in several medical specialties, including surgery. One of her most remarkable operations involved removing a watermelon-sized fibroid

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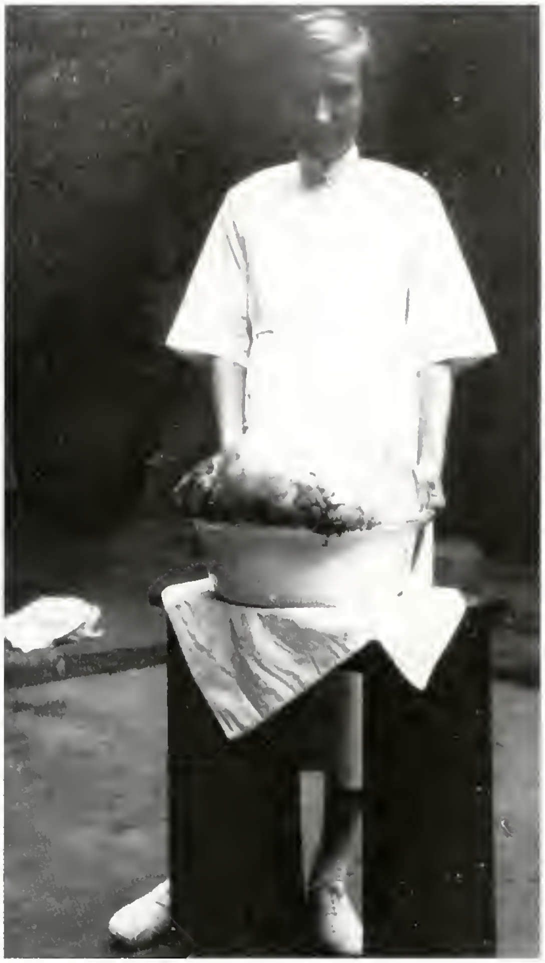

Figure 1 (left). Dr. Disosway with a watermelon-sized tumor that she removed.

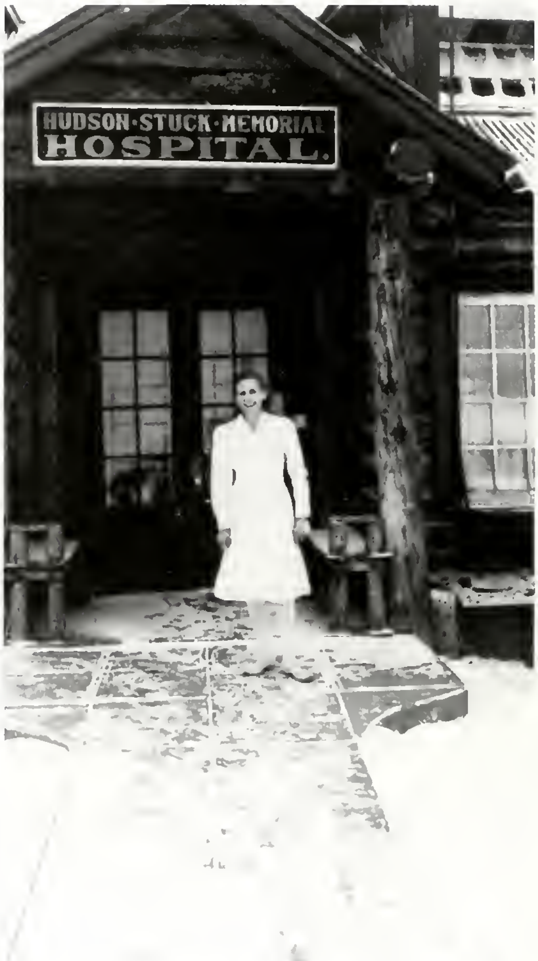

Figure 3 (right). Dr. Disosway in front of a missionary hospital in Alaska.

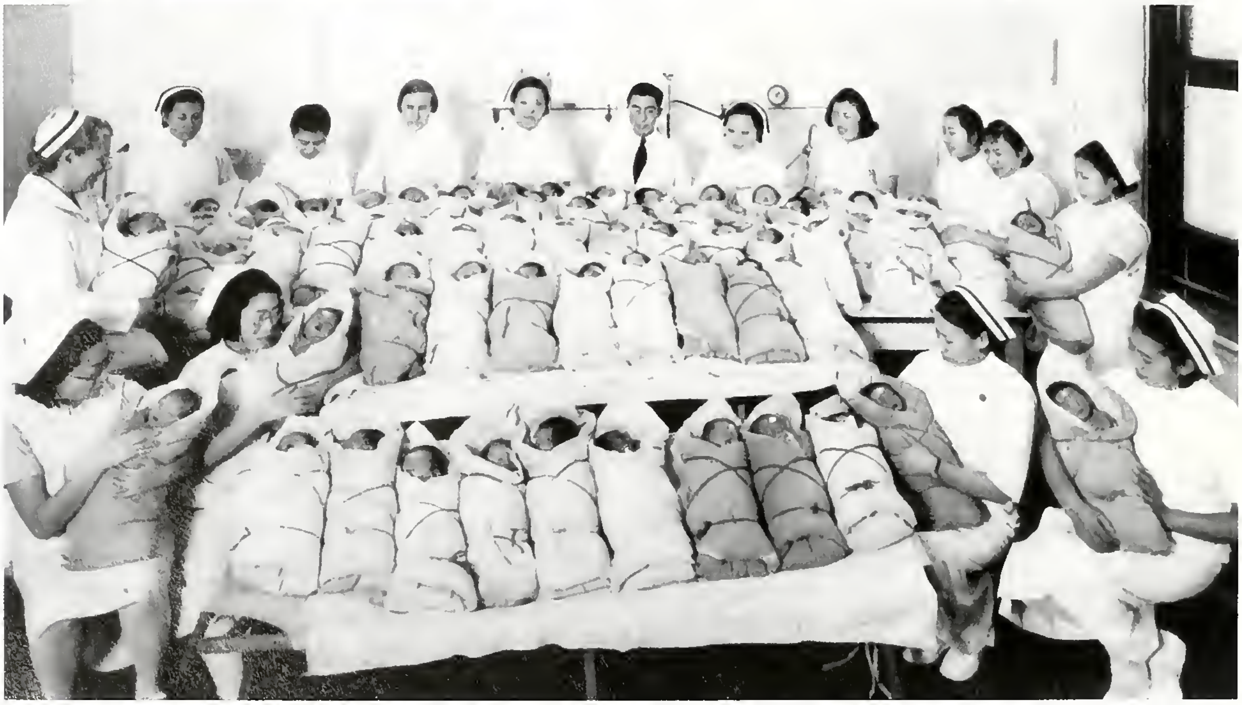

Figure 2. Dr. Disosway (back row, third from left) and staff in a crowded Chinese nursery.

from a patient's uterus (Figure 1). In addition to general surgery, Dr. Disosway became proficient in obstetrics and was appointed professor in 1938.

Her medical achievement served her well, especially during the skirmishes between Japan and China that preceded WWII. Masses of pregnant women and other refugees crammed into the cities, and so many babies were born that lack of nursery space forced the nurses to house newborns in dresser drawers. Dr. Disosway wrote in a missionary magazine: "Out of the lazy humdrum summer came rumors of war. Fifty thousand people poured in over night. Then came the crash of Friday August 13, 1937. It was unbelievable. Dead and dying were brought in, operations were running day and night, and babies were born at the rate of fourteen to twenty in 24 hours. . . All the gas was cut off, leaving the hospital with no way to sterilize. The whole routine had to be changed within the twinkling of an eye. Thanks to our loyal nurses and doctors, it was done and done smiling. We learned to deliver babies using three towels instead of six and yet keep sterile."[2] (Figure 2)

As the war in the Pacific escalated, Dr. Disosway wrote, "We have been in danger many times. Shells have fallen on our compound, through the roof of the doctors' houses and on the hospital. . . A shell came through the roof of our children's ward, tore off the side of a table, and landed in a critically-ill child's bed."[2] Finally, after 15 years of service and most reluctantly, Dr. Disosway had to leave China and return home to North Carolina. She did not stay long, however. The church urged her to try Alaska, which needed physicians. At Fort Yukon, 13 miles above the Arctic Circle, Dr. Disosway was the only doctor within 600 miles. The six months that she agreed to spend in Alaska stretched into eight years (Figure 3).

Dr. Disosway eventually did get back to North Carolina. In 1948, she returned to care for her ailing mother and remained faithful to this responsibility until her mother died in July, 1954. Later that year, she became Director of the Good Shepherd Hospital for Blacks and, with her missionary spirit intact, dedicated herself to work in the hospital's adjunct clinic. She organized free prenatal clinics, provided instruction on the care of infants, and delivered babies until her death in 1973. She had once been in love (and received a proposal of marriage), but Dr. Disosway never did marry or have children. Instead, her missionary zeal provided an extended family across the world.

Malene Grant Irons, MD (1915 -) and Isa Grant, MD (1915 - 1981)

Twin sisters Malene and Isa Grant were born on April 18, 1915, in Sunbury, North Carolina. Their mother died 48 hours later, leaving their Methodist minister father and their grandparents to raise them. But, as Dr. Malene Irons explained to us, "we would have died, if our neighbor had not breast-fed us." She further stated that she and her sister inherited many of their dead mother's characteristics, including personal determination and intellect - just the characteristics that propelled the dynamic, red-haired twins to success as pioneering North Carolina physicians.

When asked about the decision to become doctors, Dr. Malene Irons remembered: "With friends, we would go out and sit in the swing under the tree and decide what we were going to do when we grew up. At first, my sister and I thought we'd write books like *Little Women*. But then, we thought the strongest people in those books were the nurses; so, we informed our father and grandparents that we were going to be nurses." The family supported their desire to enter the medical field, but thought they should aim toward being doctors when they grew up (Figure 4).

After high school in Wilson, NC, Malene and Isa entered East Carolina Teachers College (now East Carolina University). "The faculty at East Carolina were very surprised

Figure 4. "The Twins": Malene and Isa Grant.

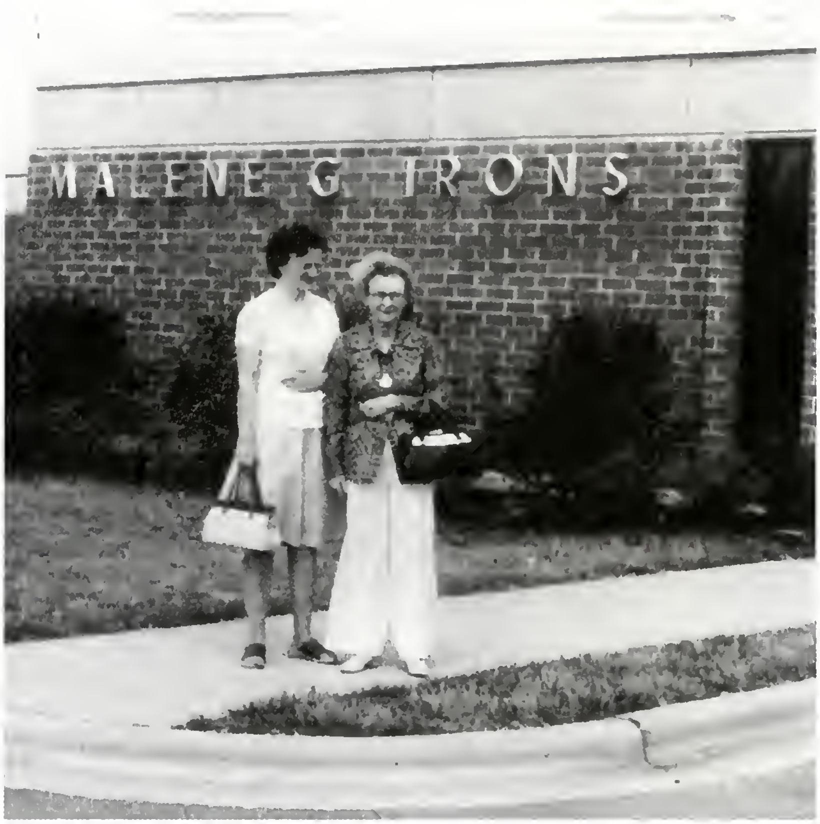

Figure 5. Dr. Malene Grant Irons (right) in front of the developmental/educational center named in her honor.

when we told them we wanted to take pre-medical courses. They did not have a planned pre-medical curriculum. However, they did suggest that we major in science and English." The twins graduated from East Carolina at the age of 16 and then took the necessary pre-medical courses at Duke University. With a sparkle in her eye, Dr. Irons said "Would you believe, we weren't accepted to Duke University School of Medicine because they said we were too frail to be doctors!" So the twins taught high school science until they had raised enough money to enroll at the Medical College of Virginia in 1937. There they made ends meet by typing papers for other students.

Malene Irons met her future husband as a first year medical student. "Fred and I worked next to each other in the physiology lab, and he found out I could do some things too. He asked me out, and we dated during the freshman year." By the end of the second year, they had decided to marry; the bride's father, Reverend Thomas Grant, performed the ceremony. The couple moved into a tiny apartment ("only a room and a small bath") near the school, but it was home despite its dimensions, and Isa was a frequent visitor.

After graduation in 1941, the Ironses stayed in Richmond to complete their training. Malene Irons recalled, "My one year of internship and three years of pediatric residency were quite busy. Many nights I would stay at the hospital and rest wherever possible. I used to sleep in a crib in the sick baby nursery when there were no stretchers to sleep on. The nurses would wake me up when I was needed; and since that time, I acquired a fondness and respect for nurses who worked with newborns."

In 1945, the couple moved to Greenville, NC. Malene was the town's first female physician, but acceptance by her medical colleagues came slowly: "It took the male physicians three years to trust me enough to send their patients to me. Luckily a new pediatrician [Dr. Earl Trevathan] came to town and shared patient coverage with me." Because of this partnership, Malene Irons was finally accepted by the medical community. The shared patient load provided Dr. Irons an added benefit: time for a family. In fact, between 1946 and 1951 and while continuing her medical practice, she gave birth to three sons.

Intermittently between 1951 and 1963, Dr. Irons served as Chief of Pediatrics at Pitt County Memorial Hospital. Her interest turned towards learning disabled and multiply disabled children. Moved by the lack of programs for such children, Dr. Irons wrote a federal grant to fund a day care program. The government responded positively, and Dr. Irons opened the Remedial Education Activity Program in 1964. Interestingly, the transition from Pediatrician to Program Director was a struggle: "It was terrible at first because I didn't feel I was helping people. In pediatrics, I saw forty or fifty children in a day and they got better; but in the developmental clinic, I saw one or two a day, and they did not improve much. Soon though, I did begin to see improvement. I knew this clinic was important for this area and was convinced that our work here was just as important as pediatrics had been."

Dr. Irons dedicated the rest of her professional life to helping children with developmental problems. In 1970, a building was constructed to house the Developmental Clinic and Remedial Education Activity Program. The Greenville community appropriately named this building for Dr. Irons in honor of her outstanding medical contributions (Figure 5).

Like her sister, Dr. Isa Grant became a pediatrician. She interned for one year in Wilkes Barre, PA, then returned to the Medical College of Virginia for residency training before setting up a private practice in Franklin, VA, in 1944. Her busy practice often kept her working six to seven days a week, but all this changed after six months. Isa contracted tuberculosis. She spent two years at Catawba Sanitarium; following her recovery, she accepted a staff position and stayed for another four years. The years at the sanitarium changed her view of life: "I don't think I've ever gotten terribly worried about anything since that time."[3]

After leaving the sanitarium, Dr. Grant's interests turned toward public health. She became Chief of Maternal and Child Health for the city of Richmond and an Instructor in Pediatrics at the Medical College of Virginia. Later, she returned to North Carolina where, from 1954 to 1957, she served as the Assistant Health Director of the Wake County Health Department under Dr. Bulla. In search of more training, she earned a Masters in Public Health at the University of North Carolina at Chapel Hill. Following the death of Dr. Bulla, she became the Health Director of Wake County, and when Wake County started a Medical Examiner System in 1963, she added the position of Chief Medical Examiner. Like most health professionals at the time, she had lamented the fact that lay-coroners, without medical experience, were required to determine causes of death. After Dr. Grant assumed the post, the Medical Examiner was at last qualified to investigate medical issues such as deaths caused by infectious diseases or accidental poisonings.

The budget was cut five years later, and Dr. Grant resigned her two Wake County posts to become the first woman Director of Public Health in Chowan, Perquimans, Pasquotank, and Camden counties. Afterwards, she assumed the roles of Chief of Chronic Disease of the State Board of Health in Raleigh (1968 - 1973) and then Assistant State Health Director for Local Services (1979 - retirement). In addition to her service in North Carolina, Dr. Grant traveled to Bolivia, where she immunized 2,800 people during a yellow fever epidemic. Her experiences in Bolivia inspired others to similar humanitarian acts.

Even though the twins' careers diverged, the two remained extremely close. Over the years, they would read about each other's specialties and talk on a daily basis. Their support of one another and that of family and friends helped each to face the challenges of a career in medicine and to derive great pleasure from her profession.

The Lessons of History

The life stories of Drs. Disosway, Irons, and Grant, show that each of these women lived to serve and heal the sick around them. As one of their medical colleagues noted, "They put their patients first, to the extent that they could. They were family people, but they went out of their way to meet patients' needs."[4] Certainly, each of these three disproved the prevailing notion that women were too frail to serve as doctors.

Dr. Disosway's eulogy (1973) describes "a dynamic bundle of energy, strength, and courage, who could keep up with and surpass most in work or accomplishment." Dr. Irons said: "I think, if a woman plans effectively and makes the right choices, she can do medicine without straining her husband or children. . . I had two people who helped us, one who looked after the children and their clothes and one who cooked and cleaned. Help was absolutely essential." Dr. Grant confidently, yet humbly, explained in the News and Observer that "It takes self-discipline, persistence, and support to become a doctor, but anyone can do it...It is mostly sweat."[3] Dedication to their patients and relentless energy, allowed Drs. Disosway, Irons and Grant to blaze a trail for women who follow. North Carolina can be proud of these women pioneers.

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Bioterrorism

A New Threat with Psychological and Social Sequelae

C. Gregory Smith MD, MPH, Philip E. Veenhuis MD, MPH, and J. Newton MacCormack, MD, MPH

Even in stable societies, destabilization or radical change can result from economic or environmental disaster, war, or any societal upheaval that leads to agitation, street disorder, and intimidation. Terrorism--a violent and often lethal form of intimidation--is intended to destabilize societies by causing fear, panic, social disorder, and economic chaos.[1] Individual or group terrorism can lead to guerrilla or civil war (as occurred recently in Peru, Zaire, and Rwanda). Even more ominous is government-sponsored terrorism (documented in Chile, Cambodia, Guatemala, Sierra Leone, East Timor, Yugoslavia, and Kosovo), which aims to suppress independence movements, reduce opposition to unpopular dictatorships, or eliminate indigenous peoples ("ethnic cleansing"). Terrorists often use conventional weapons (pistols and rifles) and explosive or thermal devices (bombs, mortars and missiles). Sometimes they use or threaten to use nonconventional (nuclear, biological, or chemical) weapons --"weapons of mass destruction." The effectiveness of any weapon can be assessed by *casualty generation* (the fraction of those exposed who are injured by a single use of the weapon) or *lethality* (the fraction who die).Traditionally, these measures have included only physical injury and illness, not the acute or chronic psychological sequelae. Nonconventional weapons appeal to terrorists because they can be highly lethal, can generate mass casualties, and, particularly, because they are likely to create fear and panic in those even marginally exposed.[1,2]

We use the word "Bioterrorism" to mean the terrorist use of microorganisms or toxins derived from microorganisms to produce death or disease in humans, animals, or plants.[3] Some 140 nations have renounced the overt use of biological warfare, but bioterrorism poses a real threat to public health and national security.[4-6] Potential bioterrorists include the mentally disturbed and psychotic, religious fanatics, political extremists, and organizations and nation states unwilling to abide by the Biological and Toxin Weapons Convention of 1972.

Biological weapons are characterized by high potency, low visibility, accessibility, and easy delivery. Inhaling one microgram of anthrax spores can be lethal, and once symptoms appear treatment is ineffective. This means a kilogram of anthrax spores could kill hundreds of thousands of people in a large city if delivered in optimal meteorological conditions. Similarly, 8 kg of botulinum toxin dispersed over 100 km^2 would, under ideal conditions, deliver a lethal dose to 50% of the population exposed. Botulism kills by paralyzing the respiratory muscles; it would be virtually impossible to provide ventilatory assistance and intensive care to large numbers of casualties.[7,8] Various hypothetical exposure scenarios for biological agents (Table 1) lead to similar catastrophic casualty estimates.[3,9-14]

Lethal amounts of biological agents are relatively easy to conceal, transport and disseminate. Unlike nuclear weapons or other advanced explosives, they can be dispersed from "crop duster" planes, backpack sprayers, humidifiers, or perfume atomizers. Recipes are readily available in public documents and on the Internet. Consequently, terrorists

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need only modest finances and basic familiarity with biology and engineering to produce effective biological weapons. Large organizations and rogue nations with access to large-scale fermentation, concentration, storage, and weapon facilities could cause major catastrophes.[5,7]

Table 1—Estimates of casualties produced by hypothetical biological attack*

Disease	Downwind Reach, km	No. Dead	No. Incapacitated
Rift Valley fever	1	400	35,000
Tick-borne encephalitis	1	9500	35,000
Typhus	5	19,000	85,000
Brucellosis	10	500	125,000
Q fever	>20	150	125,000
Tularemia	>20	30,000	125,000
Anthrax	>20	95,000	125,000

**Release of 50 kg of etiologic agent by aircraft along a 2-km line upwind of a population center of 500,000. Adapted from Christopher et al. Reprinted by permission.*

In 1984, 751 people in The Dalles, Oregon, contracted salmonellosis after members of a religious cult spread the bacteria on restaurant salad bars in an attempt to disrupt elections. In 1993, Canadian customs agents apprehended an Arkansas man who had four guns, 20,000 rounds of ammunition, and enough ricin (castor bean toxin) to kill 30 million people. Other extremists have been arrested in the US for possession of botulinum and ricin toxins. In 1995, an Ohio laboratory worker who belonged to a white supremacist group was arrested for ordering *Yersinia pestis*, the etiologic agent of bubonic plague. The bioterrorist threat to unsuspecting populations was demonstrated most dramatically when members of the Aum Shinrikyo cult attacked Japanese subway commuters in Matsumoto (1994) and Tokyo (1995) with the nerve gas sarin. More than a dozen people died, and nearly 6000 were injured. The cult was subsequently found to have an arsenal of anthrax bacilli, botulinum toxin, and VX nerve gas. Cult members had obtained Ebola virus from victims of an outbreak in Zaire. And recently we have learned of the chemical and biological weapons accumulated by Iraq.[1,10,12,15,16]

Human beings deeply fear infection and death from communicable disease.[17] The fear of contagion can be seen in the Biblical isolation of lepers; the plague pandemics of the Middle Ages; the cholera, yellow fever, and smallpox epidemics of the 19th century; and the influenza pandemics and polio epidemics of the early 20th century. Public health measures used to control the spread of communicable diseases include isolation and group quarantine. Quarantine not only diminishes secondary transmission, it provides a measure of psychological relief to those without illness who do not fully understand or accept the cause and mode of transmission of these diseases. Many of us remember the indelible images of iron lungs for polio victims or the sanatoria used to isolate and treat those with tuberculosis; more are acquainted with the psychosocial consequences of the recent AIDS pandemic, the rabies epizootic in the eastern US, Legionnaire's disease, toxic-shock syndrome, Lyme disease, the bovine variant of Creutzfeldt-Jacob disease, and other high profile diseases.

Today's news media often exacerbate public fear of contagion through reports that cite bogus "experts," distort facts, and exaggerate and sensationalize the public health risks of newly identified microbial hazards. Recent examples include media coverage of "flesh-eating bacteria" (necrotizing streptococcal infection), "mad cow disease," and "the cell from hell" (*Pfiesteria piscicida*), also called "fish AIDS" and "a waterborne Ebola virus." Emotions roused by such media coverage make it difficult for true experts in medicine, epidemiology, and infectious disease to bring reason to the situation.[17] The entertainment industry as well has capitalized on the public's fascination with microbes and the unknown, in movies ranging from the unbelievable transformation of an amoeba into "The Blob" (1958) to a somewhat more believable film, "Outbreak" (1995), which vividly depicts the public health and psychosocial sequelae of a fictional epidemic of Ebola virus hemorrhagic fever. Advertisement for this movie (viewed by tens of millions of people) shows a monkey with the caption "This animal carries a deadly virus . . . and the greatest medical crisis in the world is about to happen—try to remain calm."

The hyperbole of entertainment and media coverage, the public's innate fear of infection, and the fact that information disseminated by government agencies is sometimes skewed more toward what they want people to believe than what the facts indicate, led us to ponder the nature and history of biological terrorism, and to extrapolate (from data on natural and manmade disasters and on conventional terrorist attacks) the psychosocial consequences of a bioterrorist release of aerosolized anthrax spores, botulinum toxin, or other biological agents into a highly populated area.

We present an overview of preparedness for and responses to an attack, look at the anticipated psychological and social sequelae that would follow an attack, and summarize interventions that may help those evaluating and managing a bioterrorist crisis and may lessen acute and chronic psychological effects.

Table 2. Actual or proposed agents of terrorist attacks

Bacterial agents (diseases caused)
Bacillus anthracis (Anthrax)
Brucella spp (Brucellosis)
Clostridium perfringens (Gas gangrene)
Yersinia pestis (Plague)
Coxiella burnetti (Q fever)
Francisella tularensis (Tularemia)

Viral agents (diseases caused)
Variola virus (Smallpox, monkeypox, camelpox, etc.)
Togaviruses (Venezuelan/eastern/western encephalitis)
Various RNA viruses (Viral hemorrhagic fevers)
    Ebola virus
    Marburg virus
    Congo-Crimean hemorrhagic fever virus
    Yellow fever virus
Human rotavirus (Gastroenteritis)
Enterovirus 17 (Gastroenteritis, meningoencephalitis)

Toxins (mechanisms/effects)
Ricin (Pulmonary/gastrointestinal hemorrhage)
Tricothenes (Inhibition of DNA/protein synthesis)
Aflatoxin (Hepatotoxin, carcinogen)
Clostridium botulinum toxin (Neurotoxin, botulism-paralysis)
Staphylococcal enterotoxin B (Gastroenteritis)

Historical Perspective and Agents of Concern

Biological weapons have been used since the Middle Ages, when infected cadavers were catapulted over the walls of European cities and castles under siege. In America during the French and Indian War, the British supplied smallpox-vaccine-contaminated blankets to their Indian enemies. The advent of modern microbiology in the 19th century led to intensive efforts to identify and isolate specific pathogens suitable for use in war. During World War I, Germany mounted an ambitious, covert biological warfare (BW) program to infect livestock and contaminate animal feed destined for Allied Forces with *Bacillus anthracis* and *Burkholderia (Pseudomonas) mallei*, the etiologic agents of anthrax and glanders. The subsequent Geneva Protocol of 1925 prohibited the use of bacteriological weapons, but some signatories reserved the right to retaliate in kind if biological warfare was used against them. From 1932 until the end of World War II, Japan ran a large biological weapons research facility in occupied Manchuria, as a result of which prisoners and even entire cities were exposed to a variety of biological agents, including *B. anthracis, Neisseria meningitidis, Shigella spp, Salmonella spp, Vibrio cholera*, and *Yersinia pestis*. At least 10,000 prisoners died as a result of this experimentation, and thousands more died in field tests involving the contamination of water supplies and food with biological agents and the aerial dispersion of millions of fleas (propagated and fed on plague-infected rats) over Chinese cities. During and after World War II, many countries developed facilities for both offensive and defensive BW programs. By the late 1960s, the US biological arsenal included numerous bacterial pathogens, toxins and fungal plant pathogens (designed to induce crop failure and famine).[12]

During the 1950s and 1960s, the US military facilities at Fort Detrick, MD, and Pine Bluff, AR, conducted experiments on military and civilian human volunteers. They also studied dispersal of biological agents by exposing (surreptitiously) whole cities to aerosols of supposedly non-pathogenic bacteria such as *Serratia marcescens*. Between September 1950 and February 1951, 11 urinary tract infections (leading to one case of transient bacteremia and one death from endocarditis) followed the covert dispersal of *S. marcescens* over San Francisco. In 1976, a report in the *Washington Post* implied a causal association between such covert studies and illness (including pneumonia in Calhoun County, AL and Key West, FL). Congressional hearings and independent scientific reviews never demonstrated a definite cause, but the temporal relationship between covert military operations and illness led to a public outcry that halted military experiments on unsuspecting populations.[12]

A 1970 World Health Organization report projecting staggering casualties of BW[18] led to the Biological Weapons Convention of 1972. This convention prohibited the development, possession, and stockpiling of pathogens or toxins in "quantities that have no justification for prophylactic, protective or other peaceful purposes," and prohibited the development of systems to disperse biological agents. Existing stocks of biological agents, delivery systems and equipment were to be destroyed, and the transfer of BW technology or expertise to other countries was prohibited. (Infractions by Iraq, one of the original signatory nations, represent a notable example of the treaty's limited effectiveness.)[10,12]

In 1969 and 1970, an executive order by President Nixon ended the US offensive BW program, and led to a US policy never to use biological weapons under any circumstances. Except for small quantities retained at Ft. Detrick, stocks of pathogens in the US biological arsenal were destroyed. The US Army Medical Research Institute of Infectious Diseases (USAMRIID) was established and military efforts were directed toward research on defense against BW (diagnostic tests, vaccines, antitoxins, toxoids, drugs and other specific therapies).[3,12]

It is not clear how well other countries have complied with disarmament, because verification is difficult. During the past 25 years, several accidents have involved BW agents. The most notable of these occurred in 1979, when the release of anthrax spores from an offensive BW facility in Sverdlovsk, Soviet Union led to the death of 66 people.[19] More recently, the Iraqi development of a formidable offensive BW program, the Japanese subway attacks with sarin nerve gas, and a host of domestic threats have focused attention on BW and bioterrorism.

Biological agents and toxins capable of use as agents for terrorist acts are shown in Table 2.[1,2,7-10,20] Several of these (anthrax, botulinum toxin, and aflatoxin) were identified in the BW arsenals developed and made into weapons (some for missile deployment) by Iraq.[10] Aerosols of many viruses and bacteria are highly infectious and pose a public health threat, as illustrated by imported smallpox outbreaks that occurred in Canada (1962), Germany (1970), and Yugoslavia (1972), and by the 1979 Soviet anthrax epidemic.[21] Table 3, on pages 154-5, gives details on the infective dose, incubation period, clinical presentation, differential diagnosis, diagnostic assays, isolation precautions, chemotherapy, and chemoprophylaxis for the various agents.[8,9]

Preparedness and Response –An Overview

Bioterrorism may not provide the luxury of time for response on the part of those threatened. A bona-fide attack will pose daunting and immediate epidemiological and medical challenges. This means that the medical community, in concert with other agencies, must have planned and prepared adequately.

"Well-coordinated prevention and post-attack contingency programs can markedly reduce panic, morbidity, mortality, and costs."

In addition to death and disability, the economic impact of a bioterrorist attack could be staggering. One model estimates that an attack with a relatively non-lethal agent such as *Brucella* could cost nearly $500 million/100,000 persons exposed, while a highly lethal agent like anthrax might cost more than $25 billion/100,000 persons exposed.[13] Well-coordinated prevention and post-attack contingency programs can markedly reduce panic, morbidity, mortality, and costs. Optimal outcomes require coordinated prior planning, preparation and training among government agencies (including public health agencies and laboratories), health care facilities, and the local civilian health care community.[4,6,13] We will need action by individuals with demonstrated expertise and leadership in medicine, epidemiology, infectious disease, pathology, molecular and microbiology (to identify specific strains of organisms), nursing, emergency medicine, military medicine, veterinary medicine, public health, mental health, law enforcement, and communications. All must work together to identify and contain the problem and limit the potential for catastrophe.[1,4,17,22]

Bioterrorism may have adverse psychological effects on responders as well as the public; if rescue and medical response efforts appear to be failing, social chaos may follow. It is critical to public confidence that the leaders of a response act as a cohesive unit, keeping focused on their mission while responding to basic human needs.[23] A scientific assessment of risks, coupled with timely and accurate communication by public officials and the media, will reduce adverse psychological sequelae. Real dialogue, neither exaggerating nor downplaying the risk, will help prevent panic and demoralization.[17]

Since a bioterrorist event could quickly overwhelm local and state response capabilities, a national response capability is needed. In 1995, President Clinton signed Presidential Decision Directive 39 (PDD-39), assigning lead responsibility for cases of domestic terrorism to the FBI. PDD-39 defines responsibilities and coordination among federal agencies. As with natural disasters, the Federal Emergency Management Agency (FEMA) will coordinate federal assistance to state and local governments. The Departments of Defense (DOD), Energy (DOE), Transportation (DOT), Agriculture (DOA), and Health and Human Services (DHHS), and the Environmental Protection Agency (EPA) will assist the FBI and FEMA as necessary. Responsibility for the emergency support of "health, medical, and health-related social services" is given to the US Public Health Service (PHS) within the DHHS. In the event of a chemical or biological terrorist event, the PHS Office of Emergency Preparedness is to implement and coordinate health and medical assistance. The Food and Drug Administration (FDA) is to procure and manage stockpiles of antidotes and pharmaceuticals.[24]

The PHS has disaster medical assistance teams (DMATs) trained to deal with the special scenarios created by chemical and biological terrorism. These teams are designed to be deployed and on site within 12 hours of an event. If need be, the PHS can deliver direct medical care to disaster survivors through the National Disaster Medical System (NDMS), a system of 72 federal coordinating medical centers, which control 118,000 private-sector beds. Additional bed capacity is available at military hospitals, the US Department of Veterans Affairs and the DHHS. DHHS has created a specialized multi-agency (DHHS, DOD, DOE, and EPA) medical response team known as the Chemical-Biological Rapid Deployment Team (CBRDT). Led by the PHS and based in Washington, the CBRDT can be rapidly deployed as medical support for the on-scene manager of a terrorist incident.[24]

Because of the threat of domestic bioterrorism and our evident lack of preparedness, Congress, in 1996, passed the

Table 3 Summary of potential bioterrorism agents*

Disease (or Agent)	Infective Dose via Aerosol	Incubation Period	Diagnostic Samples (BSL)	Diagnostic Assay	Patient Isolation Procedures
Anthrax	8000-50,000 spores	1-5 days	Blood(BSL-2) Serology:ELISA	Gram Stain; Ag-ELISA	Standard precautions
Brucellosis	10-100 organisms	5-60 days	Blood, bone marrow; acute and convalescent sera (BSL-3)	Serology: agglutination Culture	Standard precautions Contact isolation if draining lesions present
Plague	100-500 organisms	2-3 days	Blood, sputum, lymph node aspirate (BSL 2/3)	Gram or Wright-Giemsa Stain; Ag-ELISA; Culture; Serology:ELISA, IFA	Pneumonic: droplet precautions until patient treated for 3 days
Q fever	1-10 organisms	10-40 days	Serum (BSL 2/3)	Serology:ELISA, IFA EM	Standard precautions
Tularemia	10-50 organisms	2-10 days	Blood, sputum, serum EM of tissue (BSL 2/3)	Culture; Serology: agglutination	Standard precautions
Smallpox	??10-100 organisms	7-17 days	Pharyngeal swab, scab material (BSL-4)	ELISA, PCR; virus isolation	Airborne precautions
Viral encephalitides	10-100 organisms	VEE 2-6days EEE/WEE, 7-14 days	Serum: VEE (BSL-3) EEE/WEE (BSL-2)	Viral isolation Serology:ELISA hemagglutination inhibition	Standard precautions (mosquito control)
Viral Hemorrhagic fevers (VHF)	1-10 organisms	4-21 days	Serum, blood Most VHF (BSL-4) RVF, KHF, YF (BSL-3)	Virus isolation. Ag-ELISA; RT-PCR Serology:Ab-ELISA	Contact precautions; more for massive hemorrhage
Botulinum	0.001 μg/kg (Type A)	1-5 days	Nasal swab (possibly) (BSL-2)	Ag-ELISA mouse neutral	Standard precautions
Staphylococcal enterotoxin B	30 ng incapacitates, 1.7 μg kills	1-6 hours	Nasal swab, serum, urine (BSL-2)	Ag-ELISA Serology: Ab-ELISA	Standard precautions

Adapted from Franz et al; reprinted by permission. Information on diagnostics, medical management, and vaccines is available from the Commander, USAMRIID. Readers should consult product literature before administering drugs or vaccines.

Abbreviations used: BSL = biosafety level; Ag = antigen; Ab = antibody; ELISA = enzyme-linked immunosorbent assay; EM = electron microscopy; IFA = immunoflourescent assay; VEE = Venezuelan equine encephalitis, EEE = eastern equine encephalitis; WEE = western equine encephalitis; PCR = polymerase chain reaction; RT-PCR = reverse transcriptase-polymerase chain reaction

Chemotherapy	**Chemoprophylaxis**	**Vaccine Availability**	**Comments**
Cipro 400mg IV q 8-12 h or DCN 200 mg, then 100 mg IV q 8-12 h or Pen 2 million units IV q 2 h plus plus strep 30 mg/kg IM q d (or gent)	Cipro 500 mg PO bid x 4 wk if unvaccinated begin initial doses of vaccine DCN 100 mg PO bid x 4 wk plus vaccination	Michigan Biological Products Institute vaccine (licensed) 0.5 ml SC at 0, 2, 4 wk; 6, 12, 18 mo then annual boosters	Vaccine: boost annually if at risk Alternative Rx: gent, e-mycin.and CAPL
DCN 200 mg/d PO plus rifampin 600-900 mg/d PO x 6 wk	DCN and rifampin for 3 wk if inadvertently inoculated	No vaccine for human use	TMP-SMX may be used for rifampin, but up to 30% relapse
Strep 30 mg/kg IM bid x 10 d (or gent) or DCN 200 mg IV then 100 mg IV q 12 h x 10-14 d. CAPL 1 gm IV q 6 h x 10-14 d (indicated for plague meningitis)	TCN 500 mg PO qd x 7 d or DCN 100 mg PO q 12 h x 7 d	Greer inactivated vaccine (licensed): 1.0 mL, then 0.2 mL; booster at 1-3 and 3-6 mo	Boost at-risk 12, 18 mo & yearly. Plague vaccine does not protect against aerosol in animal studies. Alternative Rx: CAPL or TMP-SMX
TCN 500 mg PO q 6 h x 5-7 d DCN 100 mg PO q 12 hr x 5-7 d.	TCN or DCN for 5 d; start 8-12 days after exposure	IND 610-inactivated whole cell vaccine single 0.5 mL dose SC	Recommend skin test before vaccination
Strep 30 mg/kg IM q d x 10-14 d Gent 3-5 mg/kg/d x 10-14 d	DCN 100 mg PO q12 h or TCN 2 g/d PO x 14 d	Live attenuated vaccine (IND) by scarification	Culture difficult and potentially dangerous
Cidofovir (effective in vitro)	Vaccinia immune globulin 0.6 mL/kg IM (by day 3 after exposure; best within 1)	Calf lymph vaccinia vaccine; DOD cell- culture derived vaccine(IND): scarification	Pre- and postexposure vaccine recommended if >3 y since last vaccination
Supportive therapy; analgesics anticonvulsants as needed	NA	VEE: DOD TC-83 live attenuated vaccine (IND): 0.5 mL SC once; VEE: DOD C-84 (inactivated. TC-83) (IND): 0.5 mL SC for up to 3 doses; EEE/WEE inactivated (IND):EEE 0.5 mL SC at 0 & 28 d; WEE 0.5 mL At 0, 7, 28 d	TC-83 reactogenic in 20%; 20 % don't sero-convert; only effective against sub- types 1A, 1B, 1C Vaccine used for non-responders to TC-83. EEE and WEE inactivated vaccines poorly immunogenic; require multiple doses
Supportive therapy; Ribavirin for CCHF/arenaviruses 30 mg/kg IV, then 15 mg/kg q 6 h x 4 d, then 7.5 mg/kg q 8 h x 6 d. Passive antibody for AHF, BHF, CCHF, Lassa fever	NA	AHF Candid #1 vaccine (protection for BHF) (IND) RVF inactivated vaccine (IND)	Aggressively treat secondary infections and hypotension
DOD heptavalent antitoxin (Serotypes A-G) (IND): equine despeciated 10 mL IV;CDC Trivalent equine antitoxin for Serotypes A, B, E (licensed)	NA	DOD pentavalent toxoid for serotypes A-E (IND): SC at 0, 2, 12 wk, then yearly boosters	Skin test for hypersensitivity before giving equine antitoxin. Ventilatory assistance
Ventilatory support and supportive care	NA	No vaccine available	Vomiting and diarrhea if toxin swallowed

Cipro = Ciprofloxacin; DCN = doxycycline; TCN = tetracycline; pen = penicillin; strep = streptomycine; gent = gentamycin; e-mycin = erythromycin; CAPL = chloramphenicol; TMP-SMX = trimethoprin-sulfamethoxazole; IV = intravenous; IM = intramuscular; PO = by mouth; SC = subcutaneous; qd = each day; bid = twice a day; IND = Investigational New Drug; DOD = Department of Defense; NA = not available; KHF = Korean hemorrhagic fever; YF = yellow fever Rift Valley fever; CCHF = Congo-Crimean hemorrhagic fever; AHF = Argentine hemorrhagic fever; BHF = Bolivian hemorrhagic fever.

Table 4. Contact agencies and phone numbers* for suspected bioterrorism incident or illness

NC Department of Health and Human Services (NCDHHS), Raleigh, NC
  Division of Public Health, Epidemiology and Communicable Disease Section
  General Communicable Disease Control Branch
  919/733-3419

Centers for Disease Control and Prevention (CDC), Atlanta, GA
  National Center for Environmental Health
  Emergency Response Coordination Group
  770/488-7100
US Army Medical Research Institute of Infectious Diseases (USAMRIID), Ft. Detrick, MD
  Contact the Commander at 301/619-2833
Federal Bureau of Investigation (FBI), Charlotte, NC
  704/377-9200
State Bureau of Investigation (SBI), Raleigh, NC
  919/662-4500

** Available 24 hours a day*

Table 5. Diagnostic criteria for acute stress disorder*

A. The person has been exposed to a traumatic event characterized by both of the following:
   1. actual or threatened death or serious injury, or a threat to the physical integrity of self or others
   2. a response of intense fear, helplessness, or horror

B. Either during or after the event, the person has three or more of the following dissociative symptoms:
   1. a subjective sense of numbing, detachment, or absence of emotional responsiveness
   2. a reduction in awareness of his or her surroundings (for example, "being in a daze")
   3. derealization
   4. depersonalization
   5. dissociative amnesia (that is, inability to recall an important aspect of the trauma)

C. The traumatic event is persistently reexperienced in at least one of the following ways:
   1. recurrent images, thoughts, dreams, illusions, flashback episodes, or a sense of reliving the experience
   2. distress on exposure to reminders of the event.

D. Marked avoidance of stimuli that arouse recollections of the trauma (for example, thoughts, feelings, conversations, activities, places, people).

E. Marked symptoms of anxiety or increased arousal (for example, difficulty sleeping, irritability, poor concentration, hypervigilance, exaggerated startle response, motor restlessness).

F. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning, or impairs ability to pursue some necessary task such as obtaining assistance or mobilizing personal resources by telling family members about the traumatic experience.

G. The disturbance lasts for a minimum of 2 days and a maximum of 4 weeks and occurs within 4 weeks of the traumatic event.

H. The disturbance is not due to the direct physiological effects of a substance (for example, a drug of abuse, a medication) or a general medical condition, is not better accounted for by Brief Psychotic Disorder, and is not merely an exacerbation of a preexisting Axis I or Axis II disorder.

** Adapted from DSM-IV, American Psychiatric Association*

Table 6. Diagnostic criteria for posttraumatic stress disorder*

A. The person has been exposed to a traumatic event characterized by both of the following:
   1. actual or threatened death or serious injury, or a threat to the physical integrity of self or others
   2. a response of intense fear, helplessness, or horror (in children, this may be expressed by disorganized or agitated behavior)

B. The traumatic event is persistently reexperienced in one or more of the following ways:
   1. recurrent or intrusive distressing recollections of the event, including images, thoughts, or perceptions (in young children, repetitive play may occur in which themes or aspects of the trauma are expressed)
   2. recurrent distressing dreams of the event (in children, there may be frightening dreams without recognizable content)
   3. acting or feeling as if the traumatic event were recurring (includes a sense of reliving the experience, illusions, hallucinations, and dissociative flashback episodes, including those that occur on awakening or when intoxicated); in young children, trauma-specific reenactment may occur.
   4. intense psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event
   5. physiological reactivity on exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event

C. Persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness (not present before the trauma), as indicated by three or more of the following:
   1. efforts to avoid thoughts, feelings, or conversations associated with the trauma
   2. efforts to avoid activities, places, or people that arouse recollections of the trauma
   3. inability to recall an important aspect of the trauma
   4. markedly diminished interest or participation in significant activities
   5. feeling of detachment or estrangement from others
   6. restricted range of affect (e.g., unable to have loving feelings)
   7. sense of foreshortened future (no expectation of career, marriage, children, or a normal life span)

D. Persistent symptoms of increased arousal (not present before the trauma), as indicated by two or more of the following:
   1. difficulty falling or staying asleep
   2. irritability or outbursts of anger
   3. difficulty concentrating
   4. hypervigilance
   5. exaggerated startle response

E. Duration of the disturbance (symptoms in Criteria B, C, and D) for more than 1 month.

F. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

Specify if: *Acute* (symptoms for less than three months); *Chronic* (symptoms for 3 months or more); or *With Delayed Onset* (symptoms begin at least 6 months after the stressor).

**Adapted from DSM-IV, American Psychiatric Association*

US Antiterrorism and Effective Death Penalty Act. This act regulates commerce in and the transfer of listed biological agents. In 1997, Congress enacted the Defense Against Weapons of Mass Destruction Act and amended the Defense Authorization Act to strengthen the federal government's ability to prevent and respond to bioterrorist incidents, support state and local prevention and response efforts, and improve state and local emergency capabilities. Congress recently appropriated funds to assess the risks associated with specific agents and for development of additional coordinated federal, state and local response capacities.[4,7,24,25]

In the event of a domestic bioterrorist event, the DOD can provide technical assistance, bomb disposal, decontamination, security, and other services.[24] The DOD already has an ambitious program of defense against BW and domestic bioterrorism, which includes improving surveillance and intelligence systems; developing vaccines, antitoxins, and antimicrobial prophylaxis and therapeutic protocols; developing sensitive and specific ways to detect and isolate biological agents; improving protective clothing and other protective devices; and training decontamination teams, triage personnel and field commanders.[7,26] Since 1997, the DOD has expanded the preparedness and response capabilities of local, state and federal agencies by training and equipping fire, police, rescue, and hospital emergency department personnel in over 100 US cities.[7,24] In addition, the US Marine Corps has a Chemical/Biological Incident Response Force (CBIRF), comprised of 350 Marines, Navy and support personnel. From its base at Indian Head, MD, this unit can respond to incidents of bioterrorism at home or in US facilities abroad.

The medical, psychosocial, and economic impact of a bioterrorist attack will depend on the agent or toxin used, the method and efficacy of its dispersal, the population exposed, the level of immunity in the population, the availability of effective postexposure prophylaxis, and the potential for secondary transmission. The speed with which a post-attack intervention program can be implemented is critically important, particularly when the agents involved have short incubation periods or rapid onset of action. Delay in starting prophylaxis or treatment is the single most important element leading to increased morbidity, mortality and costs,[13] but early recognition of a bioterrorist event depends on sensitive epidemiologic surveillance and a high index of suspicion on the part of health care providers who evaluate the initial cases. Following recognition, the goals of management are rapid and accurate identification of the agent involved, careful assessment of exposure, appropriate triage and quarantine, and effective treatment or immunization.[6,17] With some agents, active or passive postexposure immunization and prophylactic treatment with antimicrobial drugs may ameliorate symptoms and prevent or reduce the severity of clinical illness. Once a victim has become ill, medical personnel must institute agent-specific therapies and supportive care.[8]

> "Assessment of the symptoms associated with specific biological agents and familiarity with specific epidemiological variables may help to distinguish natural from intentional disease outbreaks."

Assessment of the symptoms associated with specific biological agents and familiarity with specific epidemiological variables may help to distinguish natural from intentional disease outbreaks. Detailed articles on the clinical assessment and medical management of patients exposed to biological warfare agents are available.[4,8,10,26-28] The DHHS, through the Centers for Disease Control and Prevention (CDC), is upgrading national, state, and local capabilities with a five-part program: 1) Preparedness Planning and Readiness Assessment, 2) Surveillance and Epidemiology Capacity, 3) Laboratory Capacity-Biological Agents, 4) Laboratory Capacity-Chemical Agents, and 5) Health Alert Network/Training. The CDC already collaborates with states in infectious disease surveillance, laboratory diagnosis, and epidemiologic support. The CDC has demonstrated effective communication with state public health agencies (in response to a series of anthrax-related threats) and has begun to educate health professionals on the public health dimensions of bioterrorism.[28-30]

When bioterrorism threats or acts occur, the local emergency response system should be activated by dialing 911 if that system is in use, or by notifying local law enforcement authorities. Local and state public health authorities and the local FBI field office also should be notified.[28] Clinicians whose patients have symptoms or illness compatible with exposure to bioterrorist agents should contact local and state public health authorities and consult infectious disease and toxin experts at academic medical centers, the CDC and the USAMRIID (see Table 4).

Adverse Mental Health Effects-Acute Stress Disorder and Posttraumatic Stress Disorder

Terrorism is a form of psychological warfare. It uses violence or the threat of violence to achieve political, religious, or ideological objectives. Terrorists select targets with maximum shock value, and they measure the ultimate success of their activities not only by number of casualties but also—and perhaps even more importantly—by the psychological effect on the whole target population.[23] The novelty of biological weapons and our deeply rooted fears of them means that there will be strong psychological and physiological responses to bioterrorist attacks.[17] There will be psychological fallout among survivors, emergency workers and those investigating an incident or containing a threat.

The first stress induced by a bioterrorist attack is the threat (and actuality) of infection. First responders, laboratory workers, emergency medical and primary care providers, epidemiologists, and pathologists are especially at risk. Fear of illness or death may lead some personnel to flee the affected area unless they are confident they can protect themselves.[17] Health care systems may be overwhelmed by the numbers of people seeking help; health care providers may need physical protection from those demanding treatment, particularly if prophylactic or therapeutic agents are scarce. The mental health of emergency workers and medical personnel will have to be closely monitored, and we will need contingency plans for dealing with public hysteria and the disruption of health care delivery.[8,12]

Unfortunately, most medical personnel are not trained to work in protective clothing or while using protective equipment such as respirators. Studies by the military show that use of protective clothing and other apparatus in disaster settings causes anxiety, claustrophobia, difficulties with breathing apparatus, overheating, dehydration, and failure to recognize danger.[1,31,32] During simulated chemical or biological warfare, 10-20% of participants experienced moderate to severe psychological symptoms and 4-10% actually had to stop the exercise because of claustrophobia, anxiety or panic, or difficulty with protective gear.[31,32] The implications are ominous for civilian health workers, who have little or no training in performing under such conditions.

Following the report of an attack, both exposed and unexposed people may experience acute anxiety due to autonomic arousal (muscle tension, tachycardia, hyperventilation, sweating, tremor, and a sense of foreboding). These symptoms may be misattributed to the bioterrorist agent. However, because many agents can cause mental dysfunction, a careful mental status examination will be required to differentiate agent-induced disorders of mood, behavior, and cognition from psychiatric disorders. Other psychological responses include horror, anger, panic, magical thinking about microbes, attribution of arousal symptoms to infection, fear of invisible agents, fear of contagion, anger at terrorists (or the government), scapegoating, paranoia, social isolation, demoralization, feelings of helplessness and hopelessness, and loss of faith in social structure.[17] Large numbers of casualties may induce panic, public hysteria and social disorder, which further disrupt health care delivery systems.[4,17]

Substantial research indicates that the mental health of emergency and first response workers, hospital-based medical personnel, and the public can be acutely and chronically affected by terrorist acts and disasters. The literature focuses on acute stress disorder (ASD) and posttraumatic stress disorder (PTSD),[17,23,34,35] for which Tables 5 and 6 (pages 156-7) outline the diagnostic criteria. These disorders manifest by flashbacks, nightmares, sleep disorders, eating disturbances, fatigue, difficulty concentrating, guilt, hypervigilance, anxiety, depressed mood, loss of libido, irritability, and social conflict. In a bioterrorism crisis, ASD and PTSD may arise from the stress of dealing with large numbers of deaths, watching one's co-workers, friends and loved ones die, the quarantine of family members or entire communities, and dealing with dead bodies (the more gruesome and slow the death, the worse the psychological sequelae). Some victims cannot come to terms with acts of terrorism unless they get external support; feelings of despair and hopelessness can lead to suicide.[17,36]

The psychological morbidity of terrorist attacks is quite high, including depression and pathological bereavement as well as ASD and PTSD.[36] A study of adult survivors of the Oklahoma City bombing indicates that 34% of 182 survivors studied developed PTSD and another 11%, other psychiatric illness (depression or substance abuse).[38] Fortunately, most people exposed to disasters and other traumatic events have no prolonged psychological sequelae,[23] but those with previous trauma, those without social supports, and first responders (police and emergency medical personnel) are at high risk.[15,17,25,27] The very nature of bioterrorism probably puts all personnel involved in trying to identify and contain the agent at high risk for psychiatric sequelae.

People report different symptoms depending on how much time has elapsed since the traumatic event. During the emergency phase (1-3 weeks after the event) survivors are preoccupied with thoughts about it and openly express their anxieties. During the inhibition phase (3-6 weeks after the event), survivors commonly experience social conflict, disturbed dreams and other health problems. The adaptation phase (6 or more weeks after the event) is characterized by remission of most signs of distress.[23]

Other Stress-Associated Sequelae

A number of studies about the sequelae of man-made and natural disasters may be pertinent to bioterrorism. The more we learn about how people cope, the better health professionals can prepare for and respond to the devastation of terrorism. In addition to ASD, PTSD, depression, and even suicide, epidemiologic studies indicate that war or natural disasters exacerbate chronic diseases such as asthma, hypertension, coronary artery disease, diabetes mellitus, peptic ulcer disease, and seizure disorder.* Some studies show a direct relationship between morbidity and mortality and the degree of devastation, loss of family and loved ones, loss of property, or relocation to unfamiliar areas. We can predict that bioterrorist events will increase the incidence of stroke, myocardial infarction, bleeding ulcers, and the medical sequelae of common chronic diseases. These events will complicate triage, particularly early in the crisis, and further stress the health care delivery system.[17]

Mental Health, Psychiatric, and Social Interventions

The primary goal of psychiatric evaluation is to assess how well survivors and especially first responders and health care personnel cope with and adapt to stress. Psychiatric intervention may also help in other ways, including the prevention of

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*For additional references, see this article in *The North Carolina Medical Journal* online, at www.ncmedicaljournal.com. - Editor group panic, careful and rapid medical evaluation and treatment, the avoidance of emotional responses such as "knee-jerk" quarantine, effective communication about risk, control of symptomatic hyperarousal (via reassurance and use of pharmacological anxiolytics as necessary), management of anger and fear, clarification of misattributed somatic symptoms, treatment of depression and suicidal ideation, provision of respite as required, and restoration of those suffering mental sequelae to effective, useful social roles in the community.[17] Social support is quite important. Friends, neighbors and colleagues can help bolster coping efficacy, and the mental, emotional and spiritual bonding that occurs within communities can overcome the trauma of terrorist bombings. The psychological value of "pulling together" within the community and the involvement of social support systems such as organized religion should not be underemphasized.[23,39] Maintaining contact with parents is especially important for children; family members should not be separated from one another if possible. If quarantine or isolation is necessary to prevent spread of infection, telecommunications (telephones, televisions, the Internet) can help prevent social isolation and a sense of stigmatization.[17]

"Given the inevitable delays in deploying federal response units, it is important that local and state agencies develop specially-trained chemical agent and biohazard first-responder teams."

The medical community has long recognized the value of early psychological intervention and counseling for victims of natural and man-made disasters. The Critical Incident Stress Management (CISM) program uses Critical Incident Stress Debriefing (CISD) to prevent or mitigate adverse psychological reactions in emergency and public safety personnel, physicians, nurses, and disaster management and relief personnel.[17,23,40-43] One facet of preparedness is the development of CISM programs and identification of CISD teams to focus on the unique psychological issues associated with bioterrorism. Given the potential need for quarantine or isolation after bioterrorist events, it may be helpful to develop "teledebriefing" capability (similar to the use of telemedicine in disasters [44]) for mental health professionals who cannot safely be brought into physical proximity with victims.[17]

Bioterrorism requires new classes of emergency response personnel. Teams trained to deal with man-made accidents and disasters involving the release of radiation, pesticides, and hazardous materials already exist in many states. However, these teams are not currently trained or adequately equipped to respond to the purposeful release of chemical and biological agents. Given the inevitable delays in deploying federal response units, it is important that local and state agencies develop specially-trained chemical agent and biohazard first-responder teams. As part of the Domestic Preparedness Program, DOD has begun such training for traditional first responders, and the PHS has established 24-hour on-call metropolitan medical strike teams (which include mental health professionals) in the nation's 120 largest cities.[24] Like their federal counterparts, these teams focus on technical assessment and management of the problem at hand, and, in collaboration with traditional first responders, they place primary emphasis on rescue and recovery, triage and prehospital treatment of the sick and injured, maintenance of public safety, and protection of property and the environment. Deployment of specialized teams will reduce the potential for psychological stress in first responders.

The effects of a terrorist release of a microbiologic agent (in contrast to a toxic gas) are usually not evident for several days, so traditional first responders may have only a limited role. It is more likely that medical personnel in emergency rooms, primary care physicians, and infectious disease specialists will be the unwitting "first responders," and may find themselves exposed--even dying--before the infectious agent is recognized. This means we will have to make a major commitment to improve and integrate epidemiologic surveillance systems at the local, state and federal levels, and educate all health workers so that they are aware of the threat.

Discussion and Summary

During World War II, the US government commissioned Norman Rockwell to paint a series of pictures depicting "The Four Freedoms"– Freedom of Speech, Freedom of Religion, Freedom from Want, and Freedom from Fear. Terrorism violates our right to be free from fear.[45] Today, a seemingly endless series of highly publicized mass killings in the workplace, schools, abortion clinics, and elsewhere fosters a growing concern about acts of terrorism. Governments and the medical profession must take steps to prevent terrorist acts and, if that effort fails, to minimize the health consequences of such acts and bring the perpetrators to justice.

The psychological issues related to terrorism include both the mind-set of the perpetrators and the psychological responses of victims and the public. The victims and the general public may have underlying psychiatric conditions aggravated or rekindled in response to a terrorist attack; otherwise psychologically healthy persons may experience *de novo* psychiatric symptoms such as anxiety, fear, hysteria or panic. Often, the perpetrators are mentally ill, and may have previously sought psychiatric treatment. Usually, their stated motivation is revenge for real or imaginary wrongs.

The threat of terrorist acts has increased efforts to have mental health and other professionals identify and report persons with fantasies of or plans for violent assaults. The Tarasoff decision[46] on "duty to warn" made mental health professionals aware that "where public peril begins, individual privilege of medical confidentiality ends." Since the 1970s, the forced hospitalization and treatment of mentally ill persons perceived to pose a risk of violence has been complicated by the strict legal standard of "clear and immediate danger to oneself or the public" as a necessary criterion for commitment. While most jurisdictions allow some flexibility, it can still be difficult to keep a person hospitalized involuntarily. Sometimes the seriously mentally ill are dangerous only if they discontinue taking psychotropic medication, or if they have access to alcohol or other drugs. This means the period of clear and immediate danger may be brief and rapidly correctable. However, some of those hospitalized for treatment will, on release, discontinue their medications or again abuse intoxicating drugs. In many states there is no way to treat these patients without their consent, but efforts are underway to address these and other problems through laws permitting commitment and conditional release.

"Psychiatrists, psychologists, and other mental health care providers should respond to persons who make terrorist threats in the same way that pediatricians and social workers respond to threats of child abuse ..."

Increased concern about BW and domestic bioterrorism coincides with a decline in cold war fears of international nuclear mass annihilation. We do not know how much stress was experienced by populations subjected to the threat of nuclear holocaust, but it was probably tempered by the protracted nature of the risk, the lengthy discussions about disarmament, and the conclusion that individuals were powerless to alter the course of international events. The threat of nuclear terrorism still exists, and we can learn something from the global experience. At the beginning of the cold war, except for vivid accounts of death and destruction in Hiroshima and Nagasaki, the general public was largely ignorant about nuclear war and the acute and chronic health effects of ionizing radiation. Subsequent scientific inquiry by the Atomic Bomb Casualty Commission and others helped define the health risks and hazards of nuclear war, and helped shape policy decisions about national and international preparedness, deterrence and disarmament.

BW is not new. What is new is the likelihood that biological, not nuclear, agents will be used both in conventional wars and in acts of domestic and international terrorism. The technology is just too simple and accessible. The psychological issues related to bioterrorism hinge on the public's abiding fear of infection and its ignorance of biomedical issues. The best way to deal with this is a concerted campaign to educate the public about bioterrorism and what governments and other agencies are doing in terms of prevention, preparedness and response. The media can play an active role by educating the public about the health threats of bioterrorism.[17]

Psychiatry has three professional roles regarding bioterrorism. The first is primary prevention. Psychiatrists can develop psychological profiles to identify individuals and organizations at risk to initiate or participate in terrorist activities. These include some people with untreated paranoid schizophrenia, xenophobics, religious fanatics and zealots, members of cults or racial and ethnic hate organizations, radical antiabortionists and environmentalists (self-proclaimed "eco-terrorists"), and those spouting anti-government or ultra-nationalistic rhetoric. Psychiatrists, psychologists, and other mental health care providers should respond to persons who make terrorist threats in the same way that pediatricians and social workers respond to threats of child abuse, and the way teachers, classmates, parents, and health care providers respond to threats of gun-related violence by disturbed students. Bioterrorism threatens national security and the public health, and its prevention must take precedence over patient confidentiality and the personal freedoms of would-be criminals. We can only wonder whether those arrested for ordering *Y. pestis* or for possessing ricin and botulinum toxins communicated clues about their intentions to family, neighbors, friends, or health care providers. In any case, states need to pass laws protecting medical professionals from civil and criminal liability when they report conversations, threats, or activities related to terrorism or other forms of violence. We already have such legislation regarding child abuse, communicable diseases, and illnesses due to occupational and environmental hazards. None of these poses as catastrophic a threat to public health as bioterrorism does.

Secondly, mental health care providers should be prepared to serve in emergency roles if needed. They should participate in local, state, and national planning and preparedness activities, including disaster drills involving bioterrorism. In the event of an actual bioterrorist event, psychiatrists will have to use their knowledge and skills to assess the efficacy of coping and adaptation by survivors and rescue personnel, especially first responders and health care workers. Psychiatric interventions, particularly those associated with CISM and CISD, will play a pivotal role in maintaining and restoring normal mental health functioning after a bioterrorist attack.

Thirdly, mental health professionals and agencies should prepare to deal with the psychosocial aftermath of bioterrorism. They should be familiar with the diagnostic criteria for Acute Stress Disorder (Table 5) and Postraumatic

Stress Disorder (Table 6) and the Critical Incident Stress Management (CISM) and Critical Incident Stress Debriefing (CISD) interventions used in post-disaster settings. Information about these topics should be reviewed regularly, and educational update programs offered on a regular basis. Understanding the potential medical and psychosocial sequelae discussed in this paper and elsewhere can provide a solid foundation for an organized and effective medical and mental health response capability.

Despite the growing concern about bioterrorism, we know little about its nature. There never has been a major attack, and so there is no track-record with which to determine how best to respond. We are today where we were 30 years ago with respect to conventional terrorism. A bioterrorist attack could create a medical, political, and social catastrophe unparalleled in history. It might even mean the imposition of martial law by the President. The greatest payoff will come from a well-organized response to an incident.[4] Consequently, we must have an effective plan for the early involvement of psychiatrists, psychologists and other mental health professionals at the local, state, and national levels.

We should keep the concept of "dual use" at the forefront as we develop multidisciplinary and interdisciplinary efforts to combat bioterrorism, and as we enhance surveillance, epidemiological, laboratory and other capacities. In 1951, the CDC created the Epidemic Intelligence Service, staffed by epidemiologists trained to respond in case of a BW attack in the US. This was doubly sensible because the sound epidemiologic investigation of disease outbreaks, whether natural or purposeful, provides big public health dividends.[8] Efforts under way in North Carolina and elsewhere to develop an enhanced public health and mental health response to the threat of bioterrorism will lead to capabilities that will be helpful in conventional terrorism and the many other natural and man-made disasters that the future holds.

Disclaimer: The opinions expressed are those of the authors and and should not be interpreted as those of the NC Department of Health and Human Services, the University of North Carolina, or the North Carolina Medical Society.

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Medical Care or Market Share?

Neil S. Prose, MD

A Note from the Editor: A business and marketing executive, speaking to a group of dermatologists, suggested to his audience that, among other things, they should consider selling skin products in their offices, and they should thank their patients (he called them customers) for their business. Dr. Neil Prose, who was in that audience, found these notions food for considerable thought and drafted the following letter to his colleagues. We saw the letter and persuaded Dr. Prose that it deserved a wider reading.

Dear Colleagues:

Mr. X's presentation at our conference certainly raises some fundamental questions about our work as physicians, and about what we really value. Since there was so little time for discussion, I am responding in writing to Mr. X's message.

First of all, credit where credit is due. We, as doctors, sometimes lose sight of the entire experience that our patients face in coming to such a large and complicated institution. To the extent that we have the power to solve some of these problems (telephone access, parking, crowded waiting rooms, surly or uncaring staff), we should do so. In these areas, we should measure ourselves against the most efficient and customer-friendly businesses. So I compliment marketing and business people for bringing these issues to our attention and helping us solve them.

Now the problem. Put simply, the application of the service industry "customer satisfaction" model to the doctor-patient relationship seems to me a recipe for disaster. I think the public's high rating of our institution comes from the way we value each person who walks into our clinic — as a patient, not as a customer. Implementing the "customer approach" in our teaching and daily practice would mean sacrificing a wonderful medical culture, to follow forever in the footsteps of Ray Kroc instead of William Osler. We would all come to regret that for generations to come.

What are the differences between a doctor-patient relationship and a vendor-customer relationship? First of all, the stakes are so much higher for the patient who is going to the doctor. Patients come with concerns that are vastly more important to their well-being than just "buying something." They tell us things about their lives that no one else hears. And so much more depends on the interaction. Patients know the difference between the consequences of a bad meal and a bad diagnosis. In the end, after all their Internet inquiries, their adventures with alternative medicine and self-medication, patients choose to place enormous trust in us.

Secondly, we play an educational role in the lives of our patients – in fact, that is why we are called doctors. Unlike the experience in a restaurant, doctors are obliged to consider both what patients want and what we know to be good for them. (Imagine a waitress telling you that the cheesecake will probably contribute to your risk of heart disease!) We have a moral and spiritual obligation to do what is right for our patients, even if it doesn't conform to market demands. At times, those decisions will hurt our "business," but we—and our patients—benefit in the long run. The customer approach is not appropriate for our role as educators of patients. We wouldn't want high school English teachers to abandon Shakespeare in favor of teenage focus groups; we shouldn't belittle our role as guides and teachers, either.

Finally, the market approach to medicine, basing our activities primarily on customer demand, will lead us into an ethical quagmire. I know there are differences of opinion on this, but I think the idea of selling products in the office—a logical extension of "patient as customer" thinking—is a mistake, a direction we need to avoid. I can't imagine thanking patients "for their business." I find it very hard to believe that any patients or families, troubled by real illness, would ever want to hear such words from their doctor. Statements like that demean the doctor-patient relationship in a fundamental way.

A few months ago, I sat next to the CEO of a major corporation on a flight from RDU to London. We talked for hours, mostly about the day-to-day pleasures and frustrations of our work. Unquestionably, his career was much more lucrative and, by most standards, much more exciting than mine. But several hours into our discussion I began to sense his envy for the work that I do. He confessed that he had seriously considered going to medical school, and he realized now that, in spite of all of his triumphs, he would always miss not having a job where success is measured by helping other people instead of corporate growth and profit. I left the plane feeling, as I often do, very fortunate for my professional life.

The work of providing health care is wonderfully special, and unique. There are business aspects to it, true, but it is much, much more than that. We need to keep it that way.

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Annual Report of the State Health Director

A. Dennis McBride, MD, MPH, Assistant Secretary for Health/State Health Director
NC Dept. of Health and Human Services

On November 12, 1999, the State Health Director delivered a report to the Annual Meeting of the North Carolina Medical Society. We print here a separate, subsequently prepared report sharing the views of the Health Director on topics of importance to the public health of North Carolina.

In this report I touch on two major areas of concern - the Hurricane Floyd Disaster and environmental health, and health disparities and the care and protection of the vulnerable - as well as a number of other important health issues.

Hurricane Floyd

Hurricane Floyd brought more flooding, environmental destruction, and human suffering to Eastern North Carolina than any prior natural disaster. It will take years for that area to recover, but North Carolinians can be proud of the response of their state's health community. As a major partner in that response, the North Carolina Medical Society helped assemble and coordinate an army of volunteer physicians, nurses, health educators, and other health workers to go into the flood area. Of particular note, the Department of Health & Human Services teamed with the North Carolina Medical Society and the UNC School of Pharmacy to create an Emergency Pharmaceutical and Medical Supply Hotline to service the flood areas. North Carolina can be thankful to its state and local public health departments, doctors, environmental health specialists, nurses, health educators, and the whole public health community for their efforts.

For public health reasons, the 13 hardest hit counties were grouped into seven zones. Each zone had a designated "Public Health Zone Coordinator" (who reported to a central "Zone Manager") who focused public health resources where they were most needed. This allowed us to work efficiently with the local health directors, environmental health workers, EOC directors, cooperative extension agencies, building inspectors, and others to provide intensive public health services where most needed. This strategy proved to be extremely effective and will be used in future events. We must remember, however, that the disaster continues. Many vulnerable people, especially the elderly, remain displaced and at health risk. Mental health needs remain unmet. Many environmental questions, such as alternatives to the open sequestration of animal waste (hog lagoons), need answers.

Floyd highlighted the need to group all environmental health activities under the aegis of public health, rather than dividing them between public health and the Department of Environment and Natural Resources, as is presently the case. Floyd also highlighted the health risk of human exposure to environmental contaminants. We have already experienced epidemics of asthma and childhood lead poisoning, as well as contamination of fish with mercury and dioxin, contamination of drinking water supplies, air pollution, and climate change.

Environmental pollution often disproportionately affects minorities and the poor, raising questions of environmental justice. To address these problems, the Department of Health and Human Services will hold a Human Health Ecology conference on June 28-29, 2000, in Raleigh, in part at the new North Carolina Natural History Museum. Dr. Rita Caulwell, director of the National Science Foundation, will deliver the keynote address. Drs. Bill Friday, David Bruton, and Bill Roper serve on the steering committee.

Asthma

In early 1999, the North Carolina Division of Public Health commissioned the UNC School of Public Health to survey 11,600 children in five public middle schools in West, Central, and Coastal North Carolina. The survey found that 10% had been diagnosed by a physician as suffering from asthma; another 19% had no formal diagnosis but had wheezing symptoms. Thus, almost 30% of the children surveyed currently had asthma or asthma-like symptoms - a strikingly high percentage!

The Division of Public Health has the job of assuring early and accurate diagnosis of asthma, taking active steps to reduce or eliminate environmental asthma triggers, collecting data, and educating the community about symptoms and risk factors. In North Carolina, we have made significant strides toward these goals; we plan to do more in terms of epidemiology, patient and health care provider education, environmental intervention, and - with the help of the North Carolina Medical Society - improved medical management.

Disproportionate Health Risks To Minorities

Asthma is only one of many diseases that disproportionately affect the poor and minority communities. African Americans suffer higher rates of cancer, diabetes, cardiovascular disease, asthma, injuries, childhood lead poisoning, HIV/AIDS, sexually transmitted diseases (STDs), and infant mortality. Racial and ethnic minorities constitute about 25% of North Carolina's population, but the proportion of AIDS cases in this population increased from approximately 50% in the early 1980s to approximately 75% in 1997-1998. From 1990 through 1998, about 75% of the cases of HIV infections have been found in minorities - mostly African-Americans, but there has been an increase in cases reported from other racial/ethnic communities, especially Hispanics. Given the rapid growth of the Hispanic population in North Carolina, we can predict increasing numbers of cases from this community. There is also a growing proportion of HIV infection in women, especially women of color.

North Carolina collects data on infection with syphilis, gonorrhea and chlamydia. For all three STDs, the case rates are significantly higher for racial/ethnic minorities than for the state population overall. In 1998, 78% of the cases of syphilis, 84% of gonorrhea, and 67% of chlamydia were reported from African Americans. In 1998, North Carolina had the greatest number of primary and secondary cases of syphilis in the nation. Half of all early syphilis cases in the US in 1998 were reported from 28 counties, five of which (Wake, Forsyth, Guilford, Mecklenburg, and Robeson) are located in North Carolina. We are committed to removing North Carolina from the dubious list. My department has instituted a major program to combat syphilis. In partnership with the Centers for Disease Control, we have syphilis elimination projects in eight high-risk counties.

AIDS Drug Assistance Program

Because of the continuing support of the Governor and the General Assembly, North Carolina's AIDS Drug Assistance Program (ADAP) was allocated $7,775,000 in FY 2000 to purchase HIV-related medications for low-income persons across the state. The program currently has about 1,650 people enrolled, and they use medication costing an average of just under $1,000 per person per month. Physicians whose patients who may be eligible for and need this program can contact either the AIDS Care Unit of the Division of Public Health (919 715-3118) or the Office of Purchase of Medical Care Services (919 733-6298).

Preventing Lead Poisoning

Lead has been and continues to be the greatest environmental hazard faced by our youngest children. In 1998, more than 3% of the children aged 1 and 2 who were screened for lead intoxication had blood lead levels high enough to cause physical and cognitive impairment. Unfortunately, primary care providers have been slow to recognize the need to screen such children (in 1998, only 25% of children aged 1 and 2 were screened). Late in 1998, we formulated new policies to encourage screening and these are now beginning to work. We expect screening to increase by almost 25% during 1999, with the increase coming largely from the private sector.

Infant Mortality

According to the State Center for Health Statistics, the infant mortality rate in North Carolina for 1998 was 9.3 deaths/1,000 live births. The infant mortality rate in 1995, 1996, and 1997 was 9.2, and the increase, while not large, is mainly attributable to a rise in African American infant mortality. National data for 1998 will not be available for some time, but North Carolina will certainly rank at or near the bottom of the list. The Division of Public Health's Office for Minority Health is developing intervention strategies to eliminate racial disparities in health status. It is going to take a major concerted effort.

Protecting The Vulnerable

The North Carolina Department of Health and Human Services has begun a Long-Term Care Safety program to strengthen the oversight of adult care homes, the training and certifying of rest home personnel, and to develop standards for special-care patients, such as those with Alzheimer's disease. Once fully instituted, this program will make North Carolina a safer place for the elderly and the disabled.

Protecting Newborns

The North Carolina Newborn Screening Program screens all newborns for five disorders - phenylketonuria (PKU), galactosemia, congenital primary hypothyroidism, congenital adrenal hyperplasia (CAH), and hemoglobinopathies. Last April, the State Laboratory obtained a state-of-the-art Tandem Mass Spectrometer to screen for disorders of amino acid, organic acid, and fatty acid metabolism. Over the ensuing four months, the State Laboratory screened 43,108 newborns with this apparatus.

Every year, as many as 600 North Carolina children are born with a significant hearing loss. Most are not identified early, but new screening techniques allow newborns to be screened shortly after birth and certainly within three months. We are happy to say that the Commission for Health Services adopted rules, effective October 1, 1999, requiring universal hearing evaluation of newborns. The rules and related guidelines were developed with the help of the NCMS Children and Youth Committee, and we are extremely grateful for this valued assistance.

Children's Health

NC Health Choice for Children, our new children's health insurance program, continues to have great success. In fact, North Carolina leads the country in enrollment in the program (in just 11 months, it has enrolled more than 51,000 children, exceeding original projections).

Medical practitioners in many areas of North Carolina have become concerned by the frequency of severe dental caries in very young children. Since very young children are often seen only in medical practices, the Division of Medical Assistance will add a Medicaid payment code allowing reimbursement of physicians who provide services to help prevent "early childhood caries," or "baby-bottle tooth decay." Primary (baby) teeth are important for a child's physical and psychological development, for chewing and speech, and to guide permanent teeth into proper position. Treating developed caries in these children is difficult and costly, so prevention is essential. The new Medicaid service will cover dental education for parents, screening of children's teeth, and application of topical fluoride varnish to prevent cavities. This service will be available for children from birth to 36 months of age. Plans are in development to help the medical community on implementation of this service.

Coordinated School Health

As part of an on-going collaboration between the Department of Public Instruction and the Department of Health and Human Services, a statewide Infrastructure Council for Healthy Schools will examine school health policies, procedures, and laws that influence the health of students. The Council will make recommendations and develop strategies to improve school health. Among the problems facing the Council is a persisting shortage of school nurses. Until that shortage is corrected, our school children will continue to be badly under-served.

Reducing Tobacco Use By Teenagers

One in every three school-age teens in North Carolina smokes. This shocking number has risen by more than 30% in the past 5 years. In January, 1,400 teens, parents, teachers, principals and community leaders joined the governor at a two-day summit in Charlotte to begin a strong teen tobacco reduction program. The summit developed community-based approaches aimed at preventing teens from starting to smoke and at helping those already using tobacco to quit. These plans for communities represent a critical partnership between public health, mental health agencies, the schools, community groups, teens and the American Cancer Society.

Tuberculosis

In 1998, the incidence of tuberculosis reached its lowest point in North Carolina's history. Fewer than 500 cases were reported that year (incidence 7.2/100,000). This represents a two-thirds reduction in incidence over the past 20 years, at a time when the national incidence was reduced by only half. Still, there are serious concerns because an estimated 375,000 North Carolinians harbor latent tuberculosis.

Most tuberculosis cases can be treated effectively with medications, but across the nation, drug-resistant organisms are found in nearly one in 10 cases. Fortunately, the resistance problem in North Carolina is below the US average - thanks in part to strict adherence to treatment regimens and directly observed therapy. We must maintain that vigilance.

Dental Benefits Added To *NC Health Choice*

New benefits provide basic dental services, application of dental sealants, simple extractions, therapeutic pulpotomies, and insertion of prefabricated stainless steel crowns. Plans are under way to increase to encourage more privately practicing dentists to participate in Health Choice.

Adolescent Pregnancy

In North Carolina, as in other southeastern states, teen pregnancy rates are consistently among the highest in the nation. In 1998, 171 of every 2,000 North Carolina women between 15 and 19 years old became pregnant. This is the lowest rate in 20 years, but there is still much work to be done.

Many county boards of commissioners are currently considering resolutions calling for repeal of the North Carolina statute that gives minors the right to obtain certain medical services (including services related to the prevention of pregnancy, treatment for emotional disturbances, prenatal care, and treatment for drug and alcohol abuse). Unfortunately, these are just the services that many of our young people most need. I urge North Carolina's doctors to talk about this issue at local medical societies and specialty societies. We need to unite as a body—and before next year's Annual Meeting—in defense of a right that has significantly improved the health status of our young people.

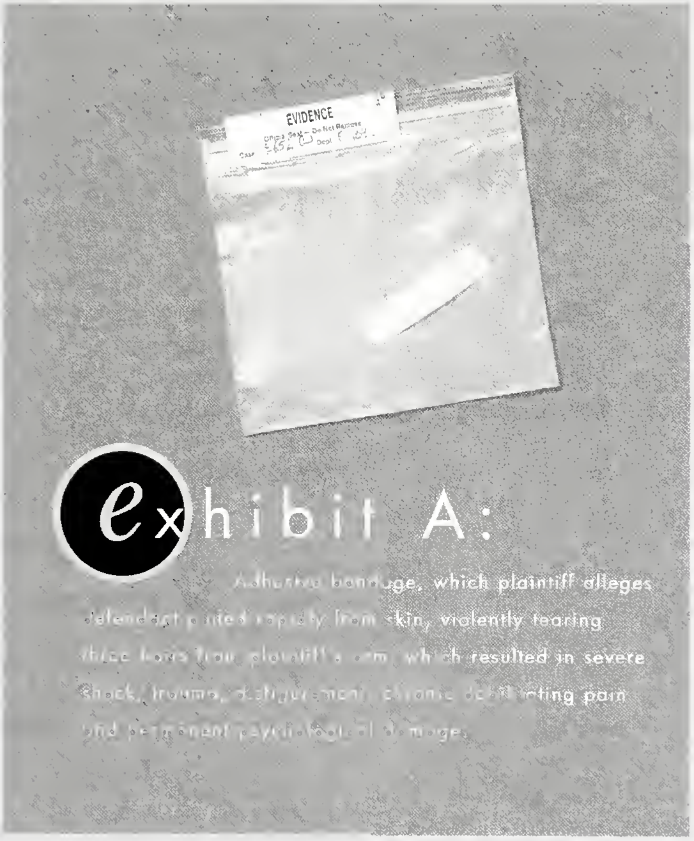
Long-Term Care

The General Assembly passed the Long-Term Care Safety Initiative largely as requested by the Department of Health and Human Services. Temporary rules went into effect in early September. Except for the rules relating to assessments for State/County Special Assistance recipients, which continue to be the responsibility of the Social Services Commission, the Medical Care Commission (to which the North Carolina Medical Society appoints three representatives) now has the statutory authority to make rules for adult care homes (rest homes). The Commission held four public hearings across the state in January and February, and will take final action on its rules at its March meeting in Raleigh.

These rules will significantly strengthen requirements for administration of medication in adult care homes by requiring that medication aides pass a competency examination consisting of a written test and a validation of clinical skills. Previously, medication aides in adult care homes had not been licensed. Other rules pertain to homes that offer special care units for Alzheimer's patients, set transfer and discharge limitations on adult care homes (similar to those in nursing homes), require a comprehensive assessment for residents receiving State/County Special Assistance, and outline staffing requirements, including an increase in supervisory staff and certification of administrators.

Bioterrorism

Bioterrorism, the last issue I will address, certainly is not the least important. Unfortunately, bioterrorism represents more than an idle threat to North Carolinians. At least three anthrax scares have been reported in North Carolina. All were proven to be hoaxes, but the system had to respond all the same. Public Health is actively involved with the NC Division of Emergency Management in a Terrorism Consequence Task Force, and the Public Health Preparedness and Response Task Force has received a planning grant from the Centers for Disease Control and Prevention. These are the first steps toward a detailed, coordinated public health response to a bioterrorist attack. Bioterrorism must command our attention and support, but let us hope that a real response will never be needed.


EVIDENCE
exhibit A:
Adhesive bandage, which plaintiff alleges defendant pulled rapidly from skin, violently tearing three hairs from plaintiff's arm, which resulted in severe shock, trauma, disfigurement, chronic debilitating pain and permanent psychological damage.

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Bright Young Stars

Remembering Some Student Medical Researchers at UNC

John B. Graham, MD

Editors note: *This article is adapted from remarks made by Dr. Graham at the 1999 meeting of the John B. Graham Student Research Society of the UNC School of Medicine.*

I shall describe some of the medical research carried out between 1950 and 1980 in collaboration with premedical and medical students. I will touch on some of the highlights of that work and tell a few stories about my colleagues. Current student researchers will find that some of their predecessors did significant research, and that many of them were interesting characters.

When I joined the faculty at UNC Chapel Hill in 1946, the Pathology department had already had experience with student researchers. Dr. Brinkhous, who arrived shortly after I, had served as a research assistant while in medical school at Iowa, and he soon amplified the existing program. Our first two research assistants were Bill Blythe (recently retired head of Nephrology at UNC) and Lawrence Hartley (a practicing pathologist in Texas). For varying lengths of time over the following decades, Brinkhous and I each had one or more of 100 students under our wings. He was primarily interested in medical students with high IQs, who might perform well at the lab bench and be attracted into careers in academic pathology. My goal was less lofty.

I had become UNC's first Markle Scholar in 1949, and the school proposed that I take a brief sabbatical elsewhere. In 1954 I spent three months at the Human Genetics Clinic in Ann Arbor, MI. At that time no one at either UNC or Duke was prepared to collect, analyze, record, and publish human genetic data, so on my return I became—by default—the local guru of medical genetics. The medical faculties at both schools soon learned that I was willing to engage in joint research on a wide range of hereditary diseases. At Michigan, genetic field work had been carried out by professional social workers, but I felt that premedical students would be more appropriate for two reasons: (1) communication would be easier because they and I had similar training in science, and (2) students were more numerous and cheaper than professional social workers.

By serving on the Medical School's Admission Committee from 1946-49, I had learned that there was a large pool of rejected medical school applicants who were as good as some of those admitted and who still hoped to enter medicine. Unlike Brinkhous, I did not look for students with high grades on the MCAT exam. I sought energetic colleagues who were self-confident, met strangers easily, reacted well in emergencies, and could convince potential subjects to cooperate with us. They would encounter and they would have to solve unexpected problems by making decisions on their own. In short, I was looking for students who would have succeeded in selling pots and pans or Bibles door-to-door. I offered them interesting work (on a livable salary and with an expense account) while they were marking time before reapplying for admission to medical school.

My contract was simple: "If you work hard for me and are honest, I will work hard to get you into medical school. If you are dishonest, or a goof-off, I'll bomb you." Happily, only one or two of my 50-odd students disappointed me. It was understood that the students would co-author any papers that grew out of our work together; this resulted in a total of 52 publications, with individual students authoring from 1-5 papers (see Table 1). Students who wrote the most papers had either spent several years in the lab or were present when on-going work was ripe for publication.

In the beginning, most of my assistants were frustrated premed applicants. Later, a number of *bona fide* medical students worked during their summer vacations (some motivated by a short-lived requirement that students produce a research "thesis" as a prerequisite for graduation.) All but one of my student co-workers finished medical school and entered practice. One or two became academics, and one recently served as President of the NC Medical Society. My

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account of the history of the Pathology Department[1] lists the names of all my students.

The work we did was what some now refer to as "old-fashioned Mendelian genetics," as distinct from "modern molecular genetics." This is because we started our studies just as Watson, Crick, Wilkins, and Franklyn were first describing the structure of DNA. It took another decade before the genetic code was firmly established, and a few more years before molecular biology became possible. The students and I asked classic genetic questions like, "Is the disease hereditary?" "Is it transmitted as an autosomal or an X-linked trait?" "Is it fully penetrant?" "Dominant or recessive?" "Can carriers be identified?" "Is it linked to any other genetic trait?"

The students traveled by car across North Carolina and adjacent states, ferreting out subjects and families, constructing pedigrees, and getting samples of blood and body fluids for our studies. They carried syringes and needles, portable centrifuges, and ice chests in their car trunks, and were sometimes out of town for a week or more. One of their early discoveries was that "dry ice" could be obtained at almost any dairy outlet! The subjects willingly provided blood—without compensation—because they believed that we were trying to help them. We drew blood in the subjects' homes without a worry about "informed consent." Indeed, we worked in an ethical milieu that never imagined today's concern about "informed consent," where written permission was needed only for a surgical operation or an autopsy. Present-day preoccupation with "informed consent" seems to have arisen since philosophers, theologians, accountants, and lawyers took over the governance of medical practice.

> "We drew blood in the subjects' homes without a worry about 'informed consent.' Indeed, we worked in an ethical milieu that never imagined today's concern ..."

Blood coagulation studies were done in my laboratory, and other specialized procedures were carried out in the labs of our collaborators. In what follows, I shall refer to some of my colleagues by a *nom de plume*—an initial or a first name—to conceal their identities and to avoid embarrassment.

Studies in Wilson's Disease

One of our earliest ventures was a look at the mode of inheritance of the common variety of polycystic kidney disease. We abandoned the study early because a laboratory in Copenhagen published the definitive report, which we had hoped to make. (We cut our losses quickly because life is short and there is no kudos in being runner-up.) We turned instead to Wilson's disease.

The field worker for the project, "C," was a tall, burly, handsome premedical student from the outermost boondocks. Soon after the project started, he came to me with a problem. He had gone to a home in Durham to obtain family data and a blood sample. A friendly lady in a negligee had met him at the door. She invited him in, provided the information, then asked if he cared to join her in a Martini. It was clear that she wanted to establish a deeper personal relationship. He asked what he should do under such circumstances. My advice was to get the information, politely decline all such invitations, and get away as fast as possible. He was an excellent field worker, but eventually succumbed to the ladies who threw themselves at him. He entered and later dropped out of medical school, but became a successful building contractor in a nearby town.

Table 1. Publication records of 25 medical students*

Number of papers	Number of students
1	8
2	10
3	2
4	2
5	2

*This accounts for all medical students who published, but omits 7 papers by a PhD candidate.

"C" and I collaborated with Dr. Alick Bearn, then a member of the Rockefeller Institute, to study familial Wilson's disease. In this condition the body accumulates excessive copper, damaging many enzyme systems, particularly in the liver and brain. "C" and I made a field trip to investigate a puzzling family in the foothills of Caldwell County. To get there, we had to cross the Catawba River over a one-lane bridge. About halfway across, a couple of tough-looking men in a pickup truck entered on the far side and proceeded toward us. We met in the middle of the bridge—almost bumper-to-bumper—at a point 50 feet above the water. I thought we should back up and let the others cross. Not "C." "We were on the bridge first; let them back up!" he said. He slowly moved our car toward them, and they slowly backed off. I was very happy indeed to finish the crossing safely and disappear into the trees. Later that day, while drawing blood from an old mountain lady, she spontaneously dropped a bombshell. "Some say that Willie Cannon was my daddy." This clarified what had up to then been a mysterious pedigree and implied that the Wilson's disease in this family was, as in other cases, a straightforward autosomal recessive trait.

Dr. Bearn wanted to determine whether heterozygous carriers of Wilson's disease could be detected by oral admin

Table 2. Specific examples of student publications

1. *N*, *N*, Hartley LJ, *N*. Canine hemophilia. J Exp Med 1949;90:97-110.
2. *N*, McLendon WW, *N*. Mild hemophilia: an allelic form of the disease. Am J Med Sci 1953;223:46-53.
3. *N*, *N*, *N*, McFalls VW, *N*. Genetic study of familial hypophosphatemia and Vitamin D resistant rickets with a review of the literature. Medicine 1958;37:97-142.
4. McCain KF, *N*. Establishment of the inheritance of Hageman defect as an autosomal recessive trait. In: Hemophilia and Other Hemorrhagic Traits. Brinkhous KM, Ed. Chapel Hill, NC: UNC Press, 1959;179-91.
5. *N*, *N*, Wynne TR. Stuart Clotting Defect III: an acquired case with complete recovery. Ibid;117-36.
6. *N*, Shankle CH, *N*, *N*, *N*. Hereditary benign intraepithelial dyskeratosis (HEBID) II. Arch Pathol 1960;70:696-711.
7. Whittaker DL, Copeland DL, *N*. Linkage of colorblindness to hemophilias A and B. Am J Hum Genet 1962;14:149-58.
8. *N*, Tarleton HL. A human double crossover. Nature 1962;195:834.
9. McLester WD. Synthesis of plasma antihemophilic factor. Nature 1963;197:708.
10. Pittman MA, Jr. Glanzmann's thrombopathy: an autosomal recessive in one family. Am J Med Sci 1964;247:293-302.
11. *N*, Heindel CC, *N*, *N*. Heterozygotes and homozygotes for von Willebrand's disease. Proc Soc Exp Biol Med 1965;118:684-7.
12. Miller CH,* *N*, *N*. Genetics of classic von Willebrand's disease I: phenotypic variations. Blood 1979;54:117-36.
13. Miller CH,* *N*, *N*. Genetics of classic von Willebrand's disease II: diagnosis by discriminant analysis. Blood 1979;54:137-45.

*PhD candidate.

istration of radioactive copper. The isotope was produced in a reactor on Long Island and had a very short half-life, so family members had to be transported to New York for the test. "C" drove five of them there in his car. When he returned, I asked if he had been afraid to go into a large city about which he knew nothing and where he might have been harmed. "No, Dr. Graham," he replied, "I had my .25 automatic in my pocket."

Blood Coagulation and Other Disorders

Some of the more important publications of my student colleagues are listed in Table 2. The names of their faculty collaborators (of whom I was always one) are omitted and replaced by an "N." Lawrence Hartley, the student worker on the first of the studies shown in Table 2, produced the original paper on our hemophilic dogs. We obtained these animals in 1947, and their abnormal gene is still segregating in matings at our kennels alongside University Lake.

Bill McLendon, who retired recently as Director of Clinical Labs at UNC Hospitals, was the field worker for the second report. In it we defined "mild hemophilia" as a distinct, X-linked genetic entity. Our data on the heterozygous women in the family were used by Mary Lyon in formulating her hypothesis that one X-chromosome is randomly inactivated in each female somatic cell.[2]

Vernon McFalls was the field worker for the third report, part of a large study of Vitamin D resistant rickets that produced a flood of papers. We localized the mutant gene to the X chromosome, leading students of Vitamin D metabolism to concentrate their attention on that chromosome. Thirty years later, our definitive monograph on Vitamin D resistant rickets took its place in the canon as a "Classic in Medicine."[3]

Frank McCain showed that Hageman Trait, an obscure coagulation abnormality, was transmitted as an autosomal recessive trait, and Tom Wynne studied the only case of acquired Stuart Factor (Factor X) deficiency that has ever been reported. It occurred in a tobacco farmer in Johnston County who tried barehandedly to poison the viruses and fungi in his seed beds with methyl bromide, which is very toxic. We assume that there was a cause and effect relation between methyl bromide and Factor X deficiency, but were not able to reproduce it experimentally.

Clemm Shankle did the field work on the HEBID syndrome, which affects the mucous membrane of the corneas and mouths of some members of the Haliwa Indian tribe. We had a bit of trouble when a staff member at the NIH tried to bribe Clemm for a copy of the pedigree. We quashed him by threatening to create a public scandal in Washington. Last year someone at the NIH wrote wrote—40 years later—asking if we could provide the names of the subjects and a copy of the pedigree for scientists doing research on keratin metabolism. Sadly, we could not find the data.

Strictly Genetic Studies

Papers 7-13 in Table 2 were genetics papers co-authored by students. Don Copeland was the primary field worker in our study of the linkage between color-blindness and hemophilias A and B. I'd like to elaborate a bit on his career. Don was drafted to serve in the Korean War while still a student at Davidson College. He survived and returned to graduate at Davidson. His grades before Korea were poor, but afterwards, excellent. The Chairman of the Admissions Committee told him to forget medical school and take a job as a pharmaceutical detail man. The premed advisor at Davidson, a friend of mine, asked me to give him another chance. Don proved to be an excellent worker and medical student, finishing in the upper third of his class.

We had accumulated the pedigrees of many type A and type B hemophiliacs, and knew that both were due to mutations on the X-chromosome. We also knew that 10% of men have color blindness—another X-linked trait. We reasoned *a priori* that there were two hemophilia genes, but we could not be certain that the mutations were not at the same site. One way to clarify the issue was to determine the linkage of color blindness to each type of hemophilia. Don and Dave Whitaker tested the color perception of all our hemophiliacs and found different crossover rates of color blindness with hemophilia A and B. This was ironclad genetic evidence that the genes for hemophilia A and B were located at different sites on the X-chromosome.

Harold Tarleton followed almost immediately with the first example of a human double crossover. Race and Sanger, the famous British blood-grouper scientists, had discovered an X-linked blood group (Xga). By sending Race and Sanger samples of blood from a hemophilia B family known to be color-blind, Harold found that the blood group gene crossed over frequently with each of the other two markers and that at least one person in the family was a double crossover. This minor tour de force was big news at the time.

> "It was a marvelous occasion: Adlai Stevenson was Master of Ceremonies, John F. Kennedy gave the address, Judy Garland sang ..."

Other papers discuss the synthesis of blood clotting Factor VIII, the genetics of Glanzmann's thrombopathy, and the genetics of von Willibrand's disease. Connie Miller, the only PhD I produced, made her name with von Willebrand's disease and is presently at the Center for Disease Control in Atlanta.

One by-product of my research activity was an invitation, soon after the Cuban Missile Crisis, to attend a banquet in Washington to kick-off the Kennedy Foundation. I was asked to bring a student and took Bill McLester. It was a marvelous occasion: Adlai Stevenson was Master of Ceremonies, John F. Kennedy gave the address, Judy Garland sang, and Bill and I sat at one of the front tables presided over by the Postmaster General. Kennedy's address was good, but Stevenson's act was superb.

A Potpourri of "Interesting" Situations

A student - let's call him "H" - did the field work on a huge family with the most common type of hypercholesterolemia. There were about 1700 members in this kindred, which was under study at Duke. We found that the trait was transmitted as a simple autosomal dominant. Interestingly, while there were more than the expected number of heart attacks in younger members of the family, some affected subjects ate eggs and lived comfortably into old age. The epidemiologists who had convinced themselves and others that eating cholesterol-rich eggs was a slow form of suicide had difficulty swallowing our results.

"H's" field work was exemplary, but he had a serious personal problem. He was married and had a child, but complained that his wife kept him on a starvation diet. Their relationship deteriorated further after he entered medical school, and she accused him of making sexual advances toward a younger sister. His father-in-law telephoned to demand that I have him expelled from medical school (I was Assistant Dean of medical students at the time.) He said that he planned to fly to Chapel Hill in his private plane and that he was a friend of then-Governor Terry Sanford. I replied that I looked forward to meeting him because Governor Sanford was a family friend who had attended grade school with my wife. Of course, he never appeared.

The wife then charged "H" with physical abuse and had him arrested. At a magistrate's hearing he was placed on a peace bond. I took the wind out of his wife's sails by underwriting the bond myself, but I knew that the two had to be separated geographically. We transferred "H" into the 3rd year class at UCLA where he graduated with honors as a member of AOA. The couple divorced and the wife married another of my field workers whom "H" had regarded as a friend. I pointed out that he was a very good friend indeed to remove a virago from "H's" life. When last heard from, "H" was practicing medicine in the west, taking care of movie stars and celebrities.

Now I come to John Perl. John was one of the most accomplished persons I have ever known. An excellent auto mechanic, carpenter, and electronic technician, and charming enough to coax birds out of the trees. He was regarded as unacceptable by our Admissions Committee because of low marks on the Medical College Admissions Test. During his two years with me, John visited the Chairman of the Admissions Committee at Harvard Medical School, who was rumored by the premed underground to understand dyslexia and how to deal with it. He tested John and found a mild dyslexia, which explained the discrepancy between grade point and MCAT scores. John was then admitted to school, did well academically, and served as President of the Whitehead Society for at least two years. He became a neurological radiologist and is now head of this specialty at the Cleveland Clinic.

Now a basketball story. As a premed, "Dan" served as undergraduate manager of Dean Smith's basketball team, a time-consuming position. His uncle had been a medical student of ours about 20 years earlier, and Dan tried to simplify his life by asking him what turned out to be the wrong question: "Do you ever use organic chemistry in your practice?" The reply was, "Of course not," so Dan decided to concentrate on the problems of the basketball team rather than organic chemistry. He got a "D" and was refused acceptance by the Admissions Committee. He was furious! Bill Huffines - a former baby sitter for my children, then an Associate Dean and one of the striped-shirt officials at the scorer's table in the Dean Dome - asked if I would hire Dan for a year of rehabilitation. Dan was a good worker, made an "A" in organic on the second try, and was admitted to medical school. (He should have asked his uncle, "Is it important to make a high grade in organic chemistry to get into medical school?") He now practices in western NC, and I hope has learned to ask the right questions of his patients.

My last story is a political one. For a short time one of our field workers was a Polish refugee who had trained as a sociologist but could not find work in the US. I gave him a job even though his command of English was not outstanding. One day I got a letter from the Governor's office asking why a State car registered to me had been observed parked in front of a notorious house of prostitution in Charlotte. Since " J" had been using the car at the time, I asked why he had parked there. He replied that to save money he was staying with a Polish friend who lived on the street and had parked in the only vacant space. I explained this in a letter to the Governor, pointing out that our very small travel budget forced us to seek the cheapest accommodations. I said we would be happy to stay in reputable motels if we could afford them. Perhaps he could transfer some money from his Contingency and Emergency Fund. Needless to say, I am still awaiting a reply.

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Welcome to the new millenium.
Keep an eye on us.

Summer Sun Protection

A. Elise Weinrich, MD, Durham Dermatology Associates, LLP

Ninety percent of Americans say they know sun exposure damages the skin. Even so, nearly half of them say they plan active sun-tanning for this summer. Some of those sun-seekers will be eventually become part of the almost one million people diagnosed each year with skin cancer.

If we know better, why do we damage our skin so casually? In increasing numbers, Americans are enjoying more and more outdoor recreation. Even those who work indoors seem to be intent on activities that involve long hours outdoors: golf, fishing, swimming, tennis, walking, gardening, boating, etc. Combine the desire to be outside with the mistaken idea that a tan is a sign of beauty and health, and the temptation is difficult to resist.

No one can realistically tell patients to "never go out in the sun." Those who say they get no sun exposure may not realize how easily they can accumulate an hour in the sun each day. A 5-minute walk down the driveway to get the mail can become a 15-20 minute talk with a neighbor; 15 minutes of watering plants can turn into 30 minutes of pulling up weeds; walking in and out of parking lots while doing errands adds up quickly. This type of "coincidenta1" sun exposure is easily handled by applying a skin moisturizer with SPF 15 sunscreen every morning. *Prolonged* sun exposure (particularly when combined with sweating) necessitates a more forceful approach.

Many reputable sources say that a sun protection factor (SPF) of 15 is adequate for all purposes, and use of any higher factor is just the result of advertising hype. I disagree. The recommendation of SPF 15 was determined under specific laboratory conditions that do not match real-use situations. For example, during testing 1 ounce of lotion was applied. The bottle you buy is usually 4 ounces. Do you use up an entire bottle of sunscreen at the beach in only 4 applications? Hardly. But if you don't apply a very heavy coat, you don't have an SPF of 15, no matter what the label says. Also, the lotions were re-applied thoroughly every 2 hours. Most people re-apply only every 3-4 hours. In the lab, "waterproof" means that the lotion persists after immersion in water and allowing the skin to drip-dry. That's not what usually happens. Most of us towel off, sweat, and wipe. The testing conditions just don't match reality. Therefore, I recommend use of a sunscreen with an SPF of 25-30 for prolonged outdoor activity. The reality is that the SPF of 30, when applied as a usual, light layer and re-applied only every few hours, and after sweating and wiping, probably comes close to a true SPF of 15. And that's a good goal.

Sunscreens today come in a wide spectrum of varieties. People who used to say, "This is too greasy"; "this makes me feel too hot"; "this smells like a fruit salad"; "this stings too much"; "this irritates me" have no excuse any more. There are clear, greaseless gels, non-stinging lotions, hypoallergenic lotions, applicator sticks, and even sprays that can be applied without any rubbing necessary (good for the tops of men's heads). In addition, special clothing (hats, shirts, shorts, and trousers) with a SPF of 30 are now increasingly available (remember, a regular white T-shirt has a SPF of only 6 or 7).

Caution: Do not use sunscreens on children less than 6 months old. They probably shouldn't be out in direct sun anyway. From age 6-12 months, a maximum of SPF 15 is safe. Over one year, an SPF of up to 40-50 should be acceptable, depending on the individual.

Social Anxiety Disorder

A Guide for Primary Care Physicians

Harold Walker Elliott, MD, and Burton Reifler, MD, MPH

Every year more than 27 million people between the ages of 15 and 54 suffer symptoms of an anxiety disorder, either as a primary condition or combined with other psychiatric illness.[1] Anxiety disorders create an enormous emotional, medical, and economic burden (they cost more than $42 billion annually).[2] Social anxiety (also called social phobia) is the most common anxiety disorder, with a lifetime prevalence of approximately 13%.[1] It is common and treatable, but it is also one of the least recognized and most under-treated of all psychiatric disorders.

The hallmark of social anxiety disorder is excessive fear of scrutiny by other people. This often leads to panic attacks, generalized anxiety, and obsessive-compulsive symptoms. *Specific social anxiety* involves fear of a particular situation such as speaking in public, writing in public, using public restrooms, or eating in restaurants. *Generalized social anxiety* may involve any or all of these scenarios in addition to a generalized fear of scrutiny by others. Social anxiety often accompanies psychiatric disorders such as depression, other anxiety disorders, and substance abuse. Social anxiety disorder is more prevalent in women than men (3:2), but men often experience more distress because of societal expectations about their ability to withstand symptoms.

A thorough history is the way to diagnose social anxiety disorder. Patients often complain primarily of nervousness, panic attacks, depressive symptoms, or obsessive-compulsive symptoms. Most individuals with social anxiety have a lifelong history of shyness and apprehension in social situations, in contrast to depression where there may be a rather abrupt onset of symptoms and social withdrawal. A history of childhood difficulty with peer interactions, with answering questions in the class, and in interacting with the opposite sex (or in romantic relationships) may help establish the diagnosis.

Patients with both panic disorder and social anxiety complain of panic attacks, but those with a primary diagnosis of social phobia usually develop panic symptoms only in the context of a social situation (when speaking in public, writing a check, or eating in a restaurant, for example). Patients with a primary panic disorder often have panic attacks without any clear precipitant (symptoms may seem to come "out of the blue," or even awaken them from sleep). Patients with social anxiety may have obsessive-compulsive symptoms, but usually in relation to social situations, interactions, or anticipated embarrassing events. For example, a patient might report intrusive thoughts of being embarrassed while ordering in a restaurant or might use some type of ritualistic compulsion as a coping strategy (for example, going to one restaurant only and always ordering the same thing). The key issue is that the intrusive thoughts are triggered by the fear of embarrassment or scrutiny. Patients with obsessive-compulsive disorder fear embarrassment, but usually the fear is that their rituals or intrusive thoughts will be discovered, rather than the primary fear of embarrassment that characterizies social anxiety disorder.

Obviously, there is overlap and co-morbidity among the anxiety disorders. Knowing the questions to ask is especially important in diagnosing social anxiety disorder because, by the very nature of the problem, patients may be unable or too ashamed to give a clear explanation. A careful history will help distinguish social anxiety disorder from similar and often overlapping conditions, and it will help with initial treatment recommendations and education. Unfortunately, patients with social anxiety often believe that their symptoms represent character flaws; a directed history and education can help them realize they have a medical condition that can be helped with medications and therapy.

A Case Example

Mr. M, a 28-year-old man with no previous psychiatric treatment, sought an evaluation for "anxiety attacks." He

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described a 15-year history of episodic intense anxiety with diaphoresis, chest pressure, flushing, tingling in extremities, racing thoughts, and diarrhea. These episodes occurred only in social situations where he feared embarrassment. He had been shy since early childhood, and he remembered a panic attack that occurred when he was 13 years old and was asked to read aloud in class. This event triggered a fear of speaking in public, which evolved into a generalized fear of embarrassing himself in social situations. He became afraid to write in public, fearing that others would see his hands tremble.

Because of his fear of reading in class, the patient met with the school guidance counselor, who accused him of trying to avoid his classroom responsibilities. He dropped out of school at age 16 to work odd jobs. He carefully avoided any tasks that involved speaking or writing in public. He became a truck driver, but increasingly found himself having to sign forms after delivering his cargo. His wife became frustrated with his social isolation, especially the fact that he would eat only in buffet restaurants in order to avoid speaking to a waitress or waiter. At his wife's urging, his primary care physician gave him a prescription for alprazolam, which the patient reported was ineffective. In fact, he felt that the alprazolam made him more anxious by making him appear impaired or "drunk," thus increasing his fear of embarrassment.

> "Patients should be screened for a history of asthma or cardiac bundle branch block because these represent relative contraindications for beta blockade....and there have been reports of depression with chronic use."

During the initial interview he was anxious and self-conscious. He was aware that his anxiety was irrational and that people were, in fact, not watching or evaluating him. He wanted more social interaction and was frustrated that his phobic symptoms restricted him so. He had no symptoms of depression or of other anxiety disorders such as obsessive-compulsive disorder, generalized anxiety disorder, or panic disorder.

After instruction about the nature and treatment of social anxiety disorder, he began taking paroxetine (Paxil), gradually increasing the dose from 5 to 20 milligrams daily. He was asked to take propanolol as needed in case of performance anxiety or for hand and voice tremors in social situations. In addition, he was referred to a psychologist specializing in cognitive behavioral therapy (CBT) who worked with him over the next three months.

The patient's panic symptoms decreased in frequency and intensity, and he noted a concomitant gradual increase in his ability to interact in social situations. He used propanolol on several occasions over the first several weeks, with noteworthy lessening of both hand tremors and anxiety. He began to accept trucking assignments in which he had to sign forms, and he successfully ordered food in a restaurant for the first time. He took paroxetine for approximately 18 months and then tapered and discontinued it because of sexual dysfunction. He had a mild increase in anxiety after discontinuing paroxetine, but he was able control the symptoms using techniques he had learned in CBT. He continued to use propanolol as needed for hand tremors and for performance anxiety in social situations. His panic symptoms remain in remission.

Treatment of Social Anxiety

Drug Therapy. Tricyclic antidepressants are no more effective than placebo in the treatment of social anxiety disorder, but other antidepressants are. Monoamine oxidase inhibitors (MAOIs) like phenelzine (Nardil) or tranylcypromine (Parnate) are perhaps the best-studied drugs; they are effective, but can cause orthostatic hypotension, and they require cumbersome dietary restrictions to avoid hypertensive crises. Therefore, selective serotonin reuptake inhibitors (SSRIs) have become the mainstay of pharmacologic treatment because of their more favorable side effect and safety profile.

Paroxetine is the only SSRI currently approved for treatment of social anxiety disorder, but other SSRI's are effective. For example, Stein et al studied 92 patients with a diagnosis of social anxiety disorder and found that fluvoxamine (Luvox) was significantly more effective than placebo.[3] Katzelnick et al found that 12 patients treated with sertraline (Zoloft) had significant improvement in anxiety symptoms compared to those receiving placebo.[4] A non-controlled study of 23 patients by Ameringen et al indicated improvement in social anxiety symptoms with nefazedone, and, in a placebo-controlled study of 69 social phobia patients, Pande et al found that gabapentin significant lessened anxiety symptoms.[5,6] Venlafaxine (Effexor), mirtazipine (Remeron), fluoxetine (Prozac), and citalopram (Celexa) have not yet been extensively studied, but there are anecdotal reports of efficacy for each. Venlafaxine (also SSRIs), nefazedone, and gabapentin have generally favorable side effect profiles, no potential for abuse, and can help any co-morbid depression, OCD, and panic. They also have a relative lack of withdrawal anxiety, which is an additional advantage when treatment is discontinued.

High-potency benzodiazepines like clonazepam and alprazolam do help social anxiety disorder. Benzodiazipines have a rapid onset of action, because of which the dosage is relatively easy to adjust. Also, unlike antidepressants, they can be taken on an as-needed basis. However, benzodiaz epines do not treat co-morbid depressive or OCD symptoms, and they also can be abused. When benzodiazepine treatment is stopped, there may be rebound withdrawal anxiety.

Beta-blockers such as propanolol and atenolol are useful in the treatment of specific performance anxiety. Some actors and musicians use these agents to block the autonomic nervous system response to anxiety (palpitations, dry mouth, tremor). Beta-blockers can be taken in anticipation of a specific event, but are less helpful when taken chronically as for generalized social anxiety. Other medical issues must be considered with beta-blockers. Patients should be screened for a history of asthma or cardiac bundle branch block because these represent relative contraindications for beta blockade. Side effects of beta-blockers include orthostatic hypotension and bradycardia, and there have been reports of depression with chronic use.

Psychological Therapy. Because patients with social anxiety disorder have exaggerated negative expectations of embarrassment in social situations, they can benefit from focused cognitive behavioral therapy. Their hypervigilance about any perceived failure or embarrassment leads to a cycle of negative thoughts and expectations that promotes further social withdrawal. CBT identifies and corrects faulty and dysfunctional perceptions, and helps patients modify their behavior. Therapy may start by having patients verbalize their fears of being evaluated by waitresses. This is followed by having them imagine what is really likely to be going on in the waitress' mind, such as getting her orders straight or dealing with issues in her own personal life. The goal is for the patient to be able to order food and eat it without anxiety.

Successful application of modified behavior in social situations decreases patients' perceptions that they are behaving inappropriately. This eventually disrupts the cycle of faulty perceptions and resulting anxiety. CBT challenges erroneous, preconceived ideas of how patients believe they are being perceived and replaces dysfunctional thoughts and behaviors with more rational and accurate ones. CBT can help patients gradually expose themselves to feared social situations while reshaping the expectation of catastrophic consequences.

Summary and Conclusions

Social anxiety disorder is prevalent, potentially disabling, but quite treatable. A thorough and directed history can distinguish social phobia from depression, panic disorder, and OCD. It can also screen for and identify possible substance abuse. Once the diagnosis is made, a combination of pharmacologic and psychotherapy is indicated. The SSRIs, MAOIs, benzodiazepines, and beta-blockers – as well as CBT – can effectively treat social anxiety symptoms.

Primary care physicians may well want to begin by prescribing an SSRI like paroxetine, along with a high potency benzodiazepine to be taken on a regular or an as-needed basis, and a beta-blocker to take as needed in anticipation of stressful social situations. A referral for CBT should be considered. If the patient has marked side effects from drug treatment or a lack of adequate response to medication, psychiatric referral is definitely indicated.

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Carolina Physician's Bookshelf

Edward C. Halperin, MD, Book Review Editor

New Books, Briefly Noted

The Book on the Bookshelf

by Henry Petroski

New York: Alfred A. Knopf, 1999. ISBN 0-375-40649-2
$26.00 in hard cover

Many physicians are self-styled book lovers and book collectors. Our offices and studies are full of learned tomes. Many of us never sold our medical school basic science textbooks. I still have a formidable looking Gray's Anatomy, 35th British Edition, on my shelf—complete with stains from the formalin (and I dread to think what else) in the margins. As a profession we insist that our hospitals and medical schools maintain libraries of books and journals, and we're constantly arguing about the best means of recording and distributing information.

I plead guilty to being a bit of a book collector. Since I tend to buy most of my older books via mail order catalogues of "old and rare" medical book dealers, I receive a steady stream of lists of items for sale. (Like any commercial enterprise, if you tend to buy via catalogues you tend to get more and more of them. Dealers, being no fools, try to latch on to customers who actually buy from catalogues rather than simply study them.) Of course, if you tend to collect in the area of radiation oncology, as I do, it is a relatively cheap hobby. Nothing is older than 1895. The folks you have to feel sorry for are the internists and surgeons. If they catch the book-buying bug, there are in it for many thousands of dollars per item.

Henry Petroski is Chairman of the Department of Civil and Environmental Engineering at Duke. He has written eight books before this one, and a host of articles for the American Scientist. One of his previous books is a lengthy volume on the history of the pencil. I also encountered an article he wrote, years ago, on the history and taxonomy of the paper clip. (Clearly Professor Petroski must have a combination of a relatively light teaching load and a fair bit of time on his hands.)

In *The Book on the Bookshelf*, we learn about the history of the book and its transformation from text on parchment, vellum, or papyrus to the product we are accustomed to today. At one time, books were considered so valuable that they were chained to the bookshelf. Since the reader was required to consult the book at the shelf, shelves were slanted to provide work surfaces and chairs were furnished so that the reader could read and take notes on site. Before the availability of artificial light, libraries needed to take maximum advantage of sunlight. The design of shelves and reading rooms accommodated this need.

A few hundred years ago, the purchaser of a book would buy an unbound collection of paper and then take the pages to a binder to be bound to order. Eventually this practice was replaced by books being bound before sale. The idea of putting the title on the spine is relatively new; it wasn't so long ago that books were shelved with the pages facing outward, rather than the spine. The contents were indicated on a little protruding tag. Book shelving has since evolved to deal with the problems of access (can you reach your books?), space (how can you stuff as much in them as possible, particularly when your books are a variety of heights and depths?), and strength.

Professor Petroski's new text is filled with interesting historical observations and useful illustrations. When he sticks to the history of books and libraries, he does fine. He tends to digress into discussions of how some of his friends have shelved or arranged books, descriptions of how he and his wife painted or stained some shelves in current or prior homes, and a lengthy discussion of fanciful ways of shelving books. For my taste, these could have been dropped and the book's length cut by a third.

You might consider *The Book on The Bookshelf* for your summer reading list. I would also recommend this book to physicians who have been dragooned into serving on their hospital/medical school/practice/departmental library committees.

Running the Numbers

A Periodic Report to North Carolina Physicians and Their Patients About Current Topics in Health Statistics

Paul A. Buescher, PhD, Editor

The Physician's Role in Cancer Registration

Cancers have been reportable diseases in North Carolina since 1947. Many physicians are not aware of the obligation to report cases of cancer to the Central Cancer Registry. Until the 1999 session of the North Carolina General Assembly, the law that authorized the Registry stipulated that physicians (and only physicians) were required to report cases. The law was changed by the General Assembly in May of 1999. Now, all health care providers are required to report cancer cases. If physicians are required to report, but many are unaware of the requirement, how does the Registry function? Some history and background will help put this into perspective.

Why have a Central Cancer Registry? A population based registry is an important public health tool that can be used to monitor cancer incidence across the state with special attention to the ways in which the incidence varies within the state and how it differs from other states. The data can be used to guide allocation of funding and for future planning of cancer prevention and screening services. It can be used to evaluate the effectiveness of current or past public health programs. It provides a database for answering the 3,000 requests for information about cancer that the Registry receives each year, and it serves as a source of data for the many research projects that are being conducted in the state.

Where does the North Carolina Cancer Registry fit in the national picture? The oldest state cancer registry in the United States was started in Connecticut in 1935. It was 25 years before another state registry was started. Hawaii has been operating a registry since 1960, Wyoming since 1962, and Utah since 1966. The National Cancer Institute began its national cancer data collection program in 1973. Most states did not start registries until the 1980s and many only began in the last decade. Today, partly with funding from the Centers for Disease Control and Prevention (CDC), all states have central cancer registries. North Carolina's registry began operating in 1986, but has statewide data only since 1990. The Registry pools its data (without identifiers) with data from other states to assist in providing a national database on cancer incidence.

How does the Registry get its data? Although physicians have been required to report new cases of cancer, it is much more efficient to get most of the data from hospitals. Because most people with cancer will go to a hospital at some point during their diagnosis or treatment, the Registry has relied primarily on this data source and has not asked physicians to report hospitalized cases. This has resulted in obtaining data on approximately 94% of the total estimated cancer cases diagnosed in North Carolina each year. During the coming year, the Registry will be working with physician

continued on next page

practices that diagnose and treat cancer patients in their offices, and with pathology laboratories, to assure that cancer cases that are not seen in a hospital are being reported. The Registry will continue to collect data from hospitals for all patients that are hospitalized and will request data from physicians only for those cases that do not go to a hospital. The Registry has free software available to help capture the needed data or it will set up mail-in reporting if that seems more appropriate. For more information about reporting cancer cases to the North Carolina Central Cancer Registry, phone Carol Dickinson at (919) 715-4564.

To access summaries of North Carolina cancer data, visit the Web site below and click on Health Statistics/ Cancer.

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CME Calendar

June 7-10
15th Annual Family Medicine Update and Review Course
Place: Chattanooga Marriott Downtown, Chattanooga, TN
Credit: Up to 25 hours, Category 1, AMA
Fees: Until May 17: $595 physicians, $475 nonphysicians; after May 17: add $100
Info: University of Tennessee College of Medicine 800/947-7823, ext. 6884; *email*: longlb@erlanger.org; *website*: www.erlanger.org

June 12-16
Ninth Annual Advanced Cardiovascular Interventions Symposium
Place: The Westin Resort, Hilton Head Island, SC
Credit: Up to 21 hours, Category 1, AMA
Fees: Physicians $850; Nonphysicians $500
Info: Meetings and Events, toll-free 877/716-2762; *website*:www.cvintervene.org

June 17-21
Cardiology in Primary Care
Place: The Cloister, Sea Island, GA
Credit: Up to 16 hours, Category 1, AMA; 15 hours, AAFP
Fees: $425
Info: Office of CME, Emory University School of Medicine; telephone 888/727-5695 or 404/727-5695. *email*: cme@emory.edu.

June 23 (8:00 a.m. - 12 noon)
Ophthalmology Residents' Day
Place: The Friday Center, UNC Chapel Hill
Credit: 4 hours, Category 1, AMA
Fees: None
Info: Christine Cotton, Dept. of Ophthalmology, UNC 919/966-5296; *email*: Christine_ Cotton @med. unc. edu

July 13-14
Bridging Research and Care: World Alzheimer Congress 2000
Place: Washington Hilton and Towers, Washington, DC
Credit: Up to 11.75 hours, Category 1, AMA (pending)
Fees: $200
Info: 312/335-5813; *email*: alzheimer2000@alz.org; *website*: www.alzheimer2000.org

July 13-14
Bridging Research and Care: World Alzheimer Congress 2000
Place: Washington Hilton and Towers, Washington, DC
Credit: Up to 11.75 hours, Category 1, AMA (pending)
Fees: $200
Info: 312/335-5813; *email*: alzheimer2000@alz.org; *website*: www.alzheimer2000.org

July 20-22
28th Annual Seminar for Physicians on Breastfeeding
Place: Hilton Head Island, SC
Credit: 16 hours, Category 1, AMA
Fees: Before June 5: $475; medical associates $400; $375 spouse/guest; after June 5: $550/$475/$450
Info: La Leche League Int'l., PO Box 4079, Schaumburg, IL 60168-4079; 847/519-7730 x218; *email*: ckolar@llli.org

July 30-August 4
Adult and Pediatric Allergy and Asthma Update
Place: Bald Head Island, NC
Credit: Up to 23 hours, Category 1, AMA
Fees: $325
Info: *Registration*: 877/227-8199; *content*: 336/373-0936; *accommodations*: 800/432-RENT or 910/457-7506, ask for Judy Treadway (refer to Group #41922)

(1) September 22-24
(2) December 10-12
Emergency Ultrasound Course
Place: (1) Charlotte, NC; (2) Columbia, SC
Credit: Up to 21 hours, Category 1, AMA; 21 hours, Category 1, ACEP
Fees: $700 physicians; $650 ACEP; $600 SCCEP; $500 residents and PAs; $450 students
Info: South Carolina College of Emergency Medicine; Thomas D. Cook, MD, 145 Sassafras Tr., Lexington, SC; *email*: huntpat@sc.rr.com; *website*: www.emergencyultrasound.com

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The *Journal* will consider for publication articles relating to and illuminating medical science, practice, and history; editorials and opinion pieces; letters; personal accounts; poetry and whimsical musings; and photographs and drawings. Papers that relate to the present, past, or future practice of the health professions in North Carolina are especially pertinent, but manuscripts reflecting other perspectives or topics are welcomed. Prospective authors should feel free to discuss potential articles with the editors.

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Prepare papers according to the "Uniform Requirements for Manuscripts Submitted to Biomedical Journals" (N Engl J Med 1991;324:424-8) with the following exceptions: 1) no abstract is needed; 2) no running title is needed; and 3) report measurements in metric units; use of the International System of Units (SI) is optional.

Submit a cover letter and a 3 1/2-inch computer disk that contains the text written in MS DOS- or Macintosh-compatible format. *Also enclose three hard copies of the text for review purposes.* Double space text with one-inch margins. *Please do not "format" the text* (e.g. no variations in type size, no bold face, no italics, no embedded endnotes).

Submit photographic illustrations, in duplicate, as high-quality color 35mm slides or 5-by-7 or 8-by-10-inch glossy prints, or as black-and-white glossy prints (5-by-7 or 8-by-10-inch). Label all illustrations with author's name, number them sequentially according to their position in the text, and indicate the orientation of the images, if necessary. *Do not write directly on the backs of prints.* This can damage them. If figures require printing in four-color process, we may ask the author to pay printing fees or a portion thereof.

Submit tables, charts, and graphs as hard copy *and* include copies on disk, in their original format *and translated as TIFF, PICT, or EPS documents.* Type all figure legends separately. Type and double-space all tables, one to a single sheet of paper. Tables must have titles and consecutive Arabic numbers.

Keep references to a minimum (preferably no more than 15), retaining those that document important points. The "Uniform Requirements" cited above contain reference format. We customarily list the first three authors for "et al"-type references. Authors are responsible for the accuracy and pertinence of all citations.

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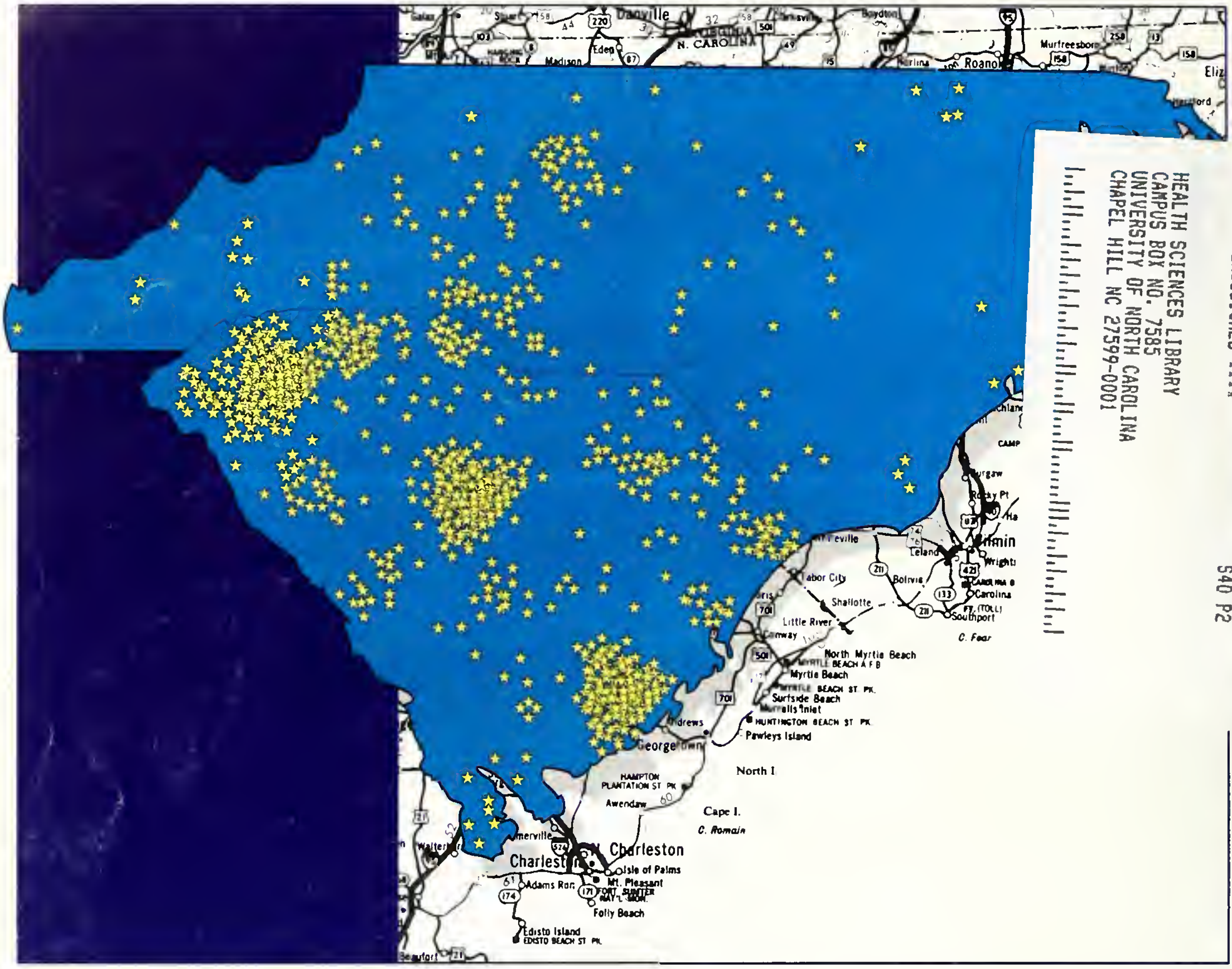

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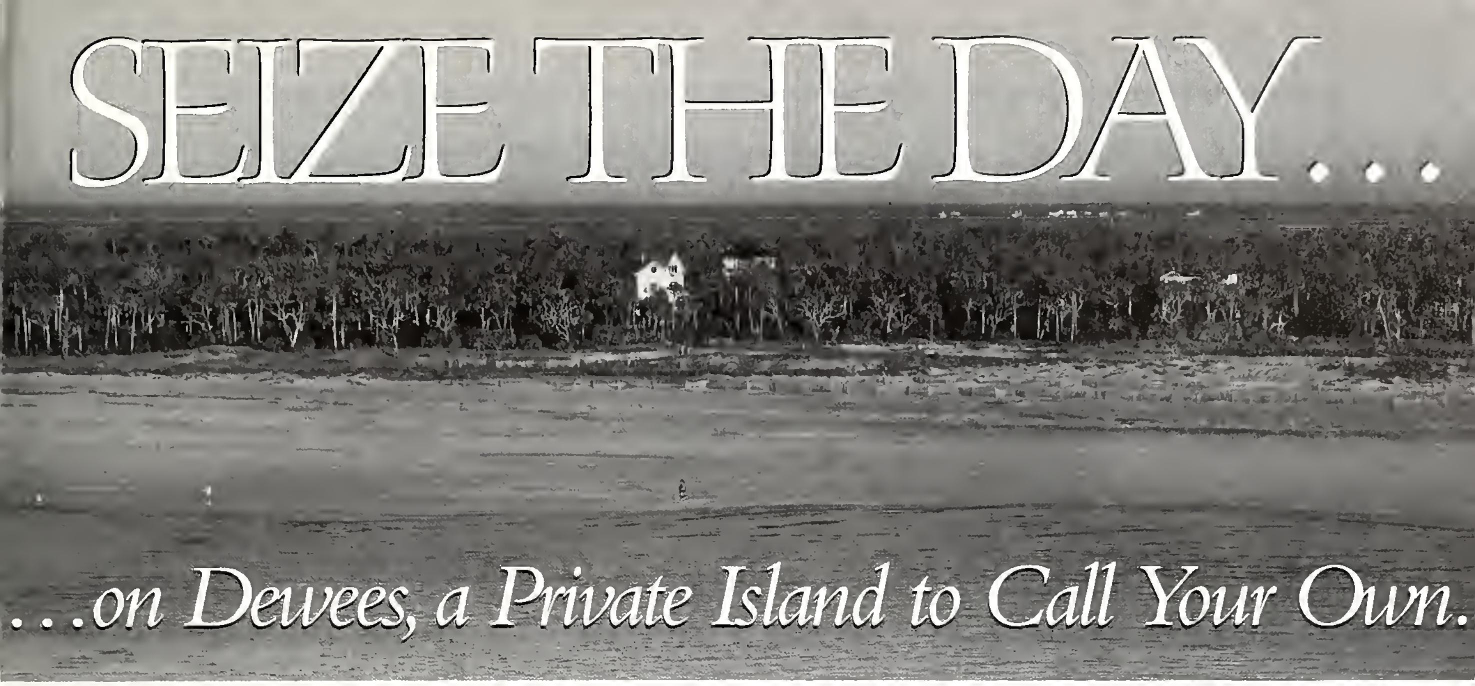

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For Doctors and Their Patients

July/August 2000, Volume 61, Number 4

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North Carolina Medical Journal

FOR DOCTORS AND THEIR PATIENTS

July/August 2000, Volume 61, Number 4

Cover: Summertime, and the beach beckons. This watercolor of a stretch of North Carolina coast is by Bob Blake, who was for many years a medical illustrator at Duke University Medical Center. Mr. Blake has contributed a number of his paintings to the *Journal* over the years, and we thank him for the opportunity to publish this one.

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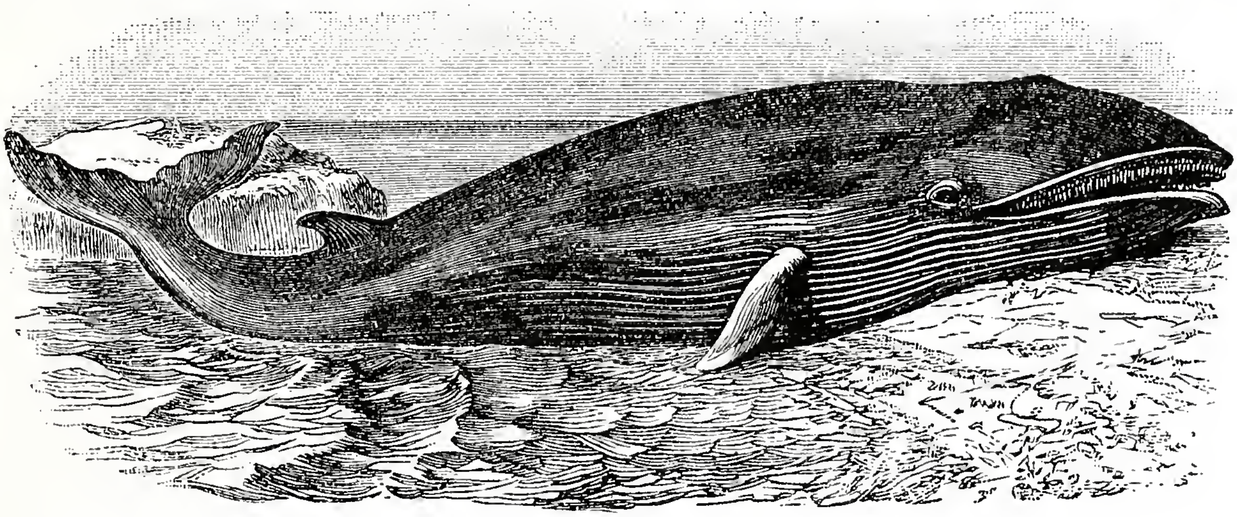

DON'T LEAVE US HIGH AND DRY!

Some *Journal* readers already know this, but it bears repeating. State medical societies across the country are struggling to define their roles: Should they limit their operations to political action, or should they concern themselves with scholarly and educational matters? State medical journals, casualties of the shift in focus, have been falling by the wayside; over the last decade, they have disappeared from New York, Ohio, Pennsylvania, Virginia, and Florida. Our own Medical Society no longer funds the *North Carolina Medical Journal.*

What Do You Think?

We have been looking for ways to support the *Journal*'s long-term publication other than through membership dues. It is clear that there is no ready source of funds; survival will require a great effort. We especially want to know the wishes of the Society at large. Do enough members want and read the *Journal*? Shall we continue to cultivate and nurture aspects of medicine independent of politics and business? Do members in general feel – as the Editor and the Editorial Board do – that publication of a professional journal is one of the main ways that the Medical Society distinguishes itself from a purely commerce or trade organization?

We Need to Hear from You

In the near future, the Journal hopes to underwrite a survey of the members – *all* members! – of the Society for their opinion about keeping the *Journal.* Is it important to you? Would you read it in on-line format? Or only in print? We would also welcome your advice about how to pay for the *Journal.* You will soon get a letter with a postpaid reply card. PLEASE take a moment to fill it out and return it promptly. Momentous decisions face the Society and the *Journal.* Be sure they reflect your wishes. Speak up.

—Francis A. Neelon, MD

Asa Gray in North Carolina

The Beginnings of Botany in the United States

John H. Felts, MD

Territorial and economic ambition, and curiosity, were major stimuli for the exploration of North America. Explorers sought new plants to treat the sick and feed the well (and, of course, to make a profit). Since drugs were then derived primarily from plants, methods of preparing botanicals and instructions for their use were expounded in elaborate herbals. These books described medicinal plants, but are often confusing to read today because of the credence given to astrological influences and the bodily humours in health and illness.[1-3]

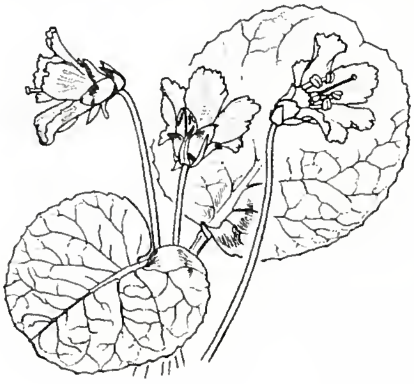

Figure 1. Oconee Bell (Shortia galaxifolia). From Radford, Manual of the Vascular Flora of the Carolinas, 1964.[10] By permission of UNC Press.

The tasks of collecting, characterizing, and preserving plants were important for the early explorers. Their expeditions often included naturalists, draftsmen, and artists whose reports influenced the taxonomic advances that led to Linnaeus's nomenclature for plants. John White's drawings of the Roanoke Island settlement in 1585, John Lawson's *A New Voyage to Carolina* (1709), Mark Catesby's *Natural History of Carolina, Florida, and the Bahama Islands* (1731), and the writings of William Bartram (1739-1823), provide us with an invaluable picture of the Carolinas during the early years.[3-7]

The Marriage of Medicine and Botany

We might be surprised to find that John Wesley, the founder of Methodism, was a member of this band of explorer-botanists, but he was extremely well-educated and his knowledge of medicine and medicinal plants far outpaced most physicians of his day. His experience in Georgia from 1735 to 1737 allowed him to examine new flora and to observe how native Americans used plants for healing. Ten years later, in 1747, he incorporated much of what he had learned into *Primitive Physic*, a compilation of remedies prepared to help England's poor help themselves, without the need for physicians or apothecaries who were often little more than charlatans.[8] In the preface, Wesley asserts that "Physic [among the tribes is] . . . chiefly traditional: every father delivering down to his sons, what he had . . . received concerning . . . healing both outward hurts, and the diseases incident to each climate, and the medicines . . . of greatest efficacy. But if any are sick, the fathers immediately tell what . . . to apply . . . Are you sick? Drink the juice of this herb, and your sickness will be at an end . . . Has the snake bitten you? Chew and apply that root, and the poison will not hurt you." Little wonder his compendium of sensible, cheap, unheroic recipes went through at least 20 editions. It provides fascinating insight into a kind of therapeutics that survives today as "alternative" medicine.[8]

Medical practice in the American colonies was a blend of European tradition and Indian lore, with the former probably predominant. A glimpse into the practices of the early Moravians who settled what is now Forsyth county in 1753 is instructive. In their *Hortus Medicus* (medical garden) at Bethabara, they grew more than 80 species of plants, almost none of which is toxic unless used in forms and concentrations inconceivable in that era.[9] Many of the plants survive as culinary herbs or have been revived in different preparations such as artemisia, effective as a vermifuge and in the management of cerebral malaria.

Dr. Felts is in the Department of Medicine/Nephrology at Wake Forest University School of Medicine, Winston-Salem, NC. Correspondence: 3335 Paddington Lane, Winston-Salem 27106-5433.

Fifty years ago, many time-honored remedies were found on the pages of the US Pharmacopoeia, and a few older members of the North Carolina Medical Society may even have studied pharmacognosy, the "branch of pharmacology that deals with the biological, biochemical, and economic features of natural drugs and their constituents." Those old-timers will remember, among other things, that quinine was bitter to taste, that most vehicles for compounding prescriptions had to smell good, and that "a teaspoonful of sugar makes the medicine go down." The mysterious and enticing smells of the drug store before World War II—now only a memory—were pharmacognostic too. Their dissipation reflects the decline and fall of herbalists and botanizers and the rise of the chemists in today's medical world.

The Divorce of Botany from Medicine

I want to turn now to the career of Asa Gray (1810-1888) who personified the transformation of herbal medical practice and the rise of scientific botany. He was born on November 11, 1810, "on the Methodist side of the Sauquoit Creek" near Utica in the Mohawk Valley of New York. At the age of 16 he entered the Fairfield Medical School, which ran from 1809 to 1840. By attending two lecture sessions there, and practicing medicine for three years, he qualified for a degree in January, 1831. His formal education thus ended before he was 21 years old, but in a nation overpopulated with doctors, Gray found it hard to make a living. With time on his hands, he began to study the plant kingdom at the exciting dawn of the application of Linnaean principles of classification. His career took a decisive turn in 1836 when he published his definitive *Elements of Botany*, written for doctors and farmers.[11,12]

He traveled to Europe in 1839, and in Paris found an unclassified plant, taken from the New World to the herbarium of André Michaux at the Jardin des Plantes. Gray's discovery led him to visit the "high mountains" of North Carolina five times in search of a blooming specimen of the plant. He was able continue his quest because Harvard College in 1842 named him Fisher Professor of Natural History and director of its Botanic Gardens, posts for which he was eminently qualified. At the time, a degree in medicine was a prerequisite for a professorship in botany at most American universities—and he had one. The Harvard appointment allowed him to devote half his time to research, a pioneering step in the establishment of a new academic discipline in his native land.[11,12]

The Harvard professorship marks the divergence of medicine and botany as academic disciplines. The split had been presaged in 1828 when another physician, Friedrich Wohler (1800-1882), was diverted into chemistry and performed the first organic chemical synthesis (of urea from ammonium nitrate) in Liebig's laboratory in Germany.[13] The branches would eventually rejoin to produce synthetic versions of herbal compounds in pure form—allowing more accurate and better controlled therapy. The sequence is exemplified by foxglove, which progressed from Withering's work with "a family receipt for the cure of the dropsy" to the isolation and purification of digoxin and digitoxin.[14]

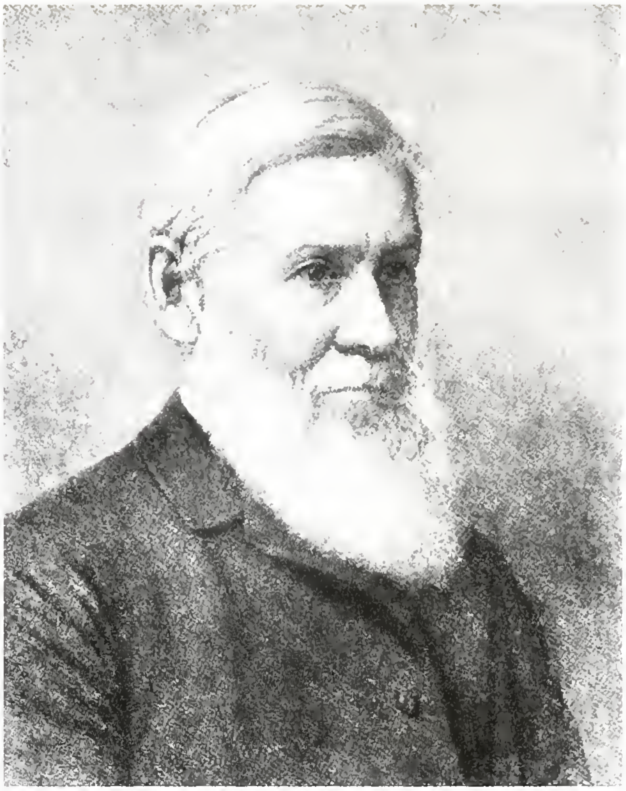

Figure 2. Asa Gray. From an engraving by Gustav Kruell, 1890. Reprinted in Kelly, HA. Some American Medical Botanists. New York, NY: D. Appleton & Company, 1929.

Despite his efforts, Gray never saw in its native habitat the plant he found in Michaux's herbarium, but he was able to exercise his right as discoverer to name it for his friend and fellow physician-botanist, Charles Short (1794-1862). *Shortia galacifolia* is now known commonly as "Oconee Bell" because Andre Michaux, botanist to the king of France, found it in December, 1788, just across the border separating North Carolina's Transylvania county from Oconee county in South Carolina.[15]

Gray's reports of his visits to North Carolina provide vivid descriptions of the mountains and their people.[11,15] On his first trip in June, 1841, he found limited accommodation near Ashe Courthouse (now Jefferson), then a "hamlet of 20-30 houses." He was cordially received and was pleased that residents never tried to "make unreasonable charges." They were, however, mystified as to why anyone would be interested in plants they considered weeds. Gray added that he found Ashe to have generally "good cornbread and milk" although the latter was "quite sour and even curdled." On the trip his party climbed Grandfather, Bluff, and Roan Mountains finding the climate "essentially Canadian."[12,15]

Gray returned two years later, this time descending the Johns River, climbing Table Rock Mountain to reach Asheville through the Swannanoa Gap where he viewed the Black Mountains. Three decades later he came again, this time to Wilimington where he found "the spring in all its beauty, a month in advance of our tardy north" and "collected a lot of live Dionaeas," the famous Venus fly trap. In 1876, accompanied by his wife, he renewed his acquaintance with mountainous North Carolina. He found little change in the country "where I used to roam and botanize more than 30 years ago, the people still cut off from the lower lands by roads that were mostly used only for horses . . . [O]ne traveled sometimes two or three days without meeting a wheeled vehicle, [the people] were very plain and primitive in their ways, and one had to depend at times on their hospitality for accommodation." Gray visited the mountains twice more, but his valedictory in 1884 makes little comment about the terrain except to note that a "narrow gauge railroad" had been built in the vicinity of Roan Mountains, presumably to serve the timber industry.[12]

Completing the Circle

In May 1877, George M. Hyams, son of a prominent Statesville collector, rediscovered *Shortia* in its natural habitat on a hillside in McDowell county. Thus Gray's quest ended 36 years after it began, but he did not learn of the discovery for another year.[12] When he did, he promptly reported the event in French and American botanical journals.[17] In 1886, Professor Charles Sprague Sargent, Gray's successor at Harvard and translator of Michaux's journals was "rewarded by finding the plants in abundance" at the original site. Now it could properly be christened Oconee Bell. The next spring Sargent's groups found it in full bloom: "Masses of dainty little fingered bells each swaying in the mountain breeze on its pink-tinted stem, arising about 6 inches from rosette of closely scalloped leaves."[12]

From undistinguished beginnings in upstate New York, and blessed with little formal education, Gray became one of the great scientists of our nation, respected the world over. As physician-turned-botanist, Gray's life is a testimony to the value of native genius and unremitting industry, as shown by his administrative success and written works. His historical sketches of his fellow natural philosophers tell an exciting story. For physicians of today, attentive to our forebears, it must be pointed out that between 1859 and 1886 he wrote 39 eulogies of outstanding contemporaries in botany; 17of them had studied medicine, which speaks to the nature and challenge of 19th century medical education.[16]

Three historical markers commemorate Gray's explorations in our mountains: in Ashe county northeast of Linville, at Grandfather Mountain in Avery, and at Bakersville in Mitchell County.[18] When doctors come upon them they should be reminded that he was one of us, and be properly appreciative.

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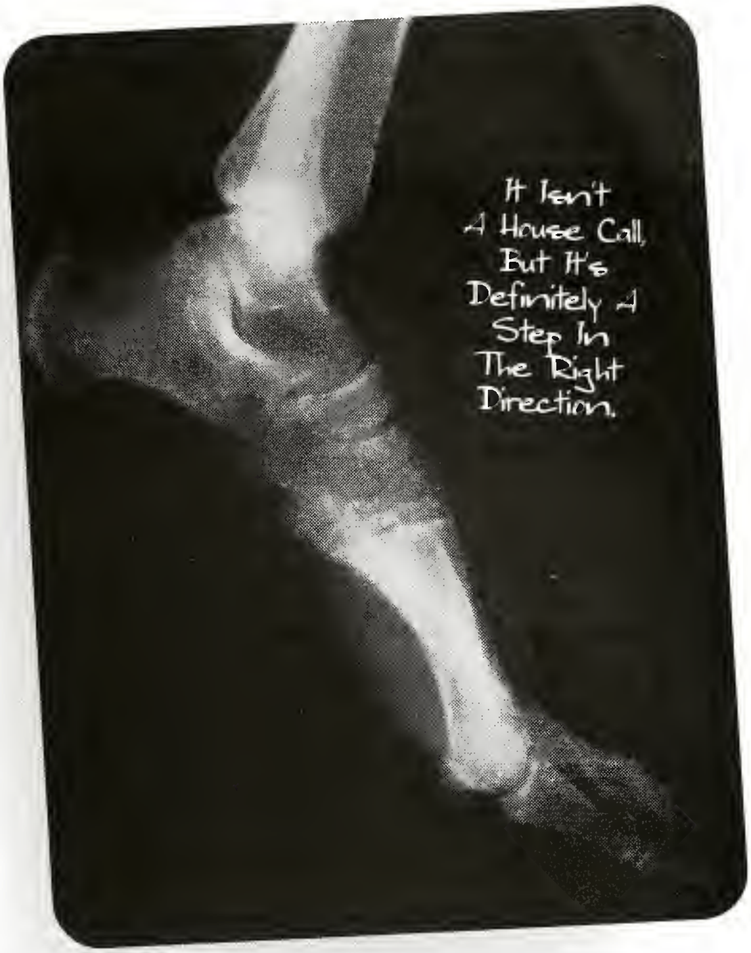

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Running the Numbers

A Periodic Report to North Carolina Physicians and Their Patients
About Current Topics in Health Statistics

Paul A. Buescher, PhD, Editor

◆

Monitoring Maternal and Infant Health Risks

The Pregnancy Risk Assessment Monitoring System (PRAMS), an ongoing mail/telephone survey of women who have recently given birth, collects information that will help improve the health of mothers and babies in North Carolina. Sponsored by the Centers for Disease Control and Prevention (CDC), PRAMS is managed in North Carolina by the State Center for Health Statistics.

PRAMS surveys such topics as prenatal care, infant sleep position, infant safety, alcohol and tobacco use, nutrition, social support, stress, attitudes about pregnancy, domestic violence, intendedness of pregnancy, use of birth control, knowledge and use of folic acid, breastfeeding, and family income. Much of this information is not available through birth certificates or other existing data sources.

Each month, approximately 200 women who have recently given birth are selected at random from birth certificates. We send up to three mailed surveys (English and Spanish), and then try to contact by telephone the women who did not respond by mail. Approximately 1,800 surveys are completed each year, for a completion rate of 75%. Low-weight births are oversampled to permit analysis of risk factors for these outcomes, and the data are weighted to produce estimates for all North Carolina live births in the year. All personal identifiers are kept strictly confidential. With this relatively small sample size, it is not feasible to generate estimates from PRAMS for counties or other small geographic areas.

The information collected by PRAMS is self-reported by the mothers and thus has some limitations. Selected results for the 1998 respondents (latest available data) follow:

· Mother did not take folic acid every day before pregnancy	76%
· Usual sleeping position for baby was on stomach or side	54%
· Pregnancy was unintended	47%
· Mother did not breastfeed at all	38%
· Annual family income was less than $14,000	29%
· Moderate or serious postpartum depression was reported	21%
· Mother smoked during last three months of pregnancy	16%
· Mother reported physical abuse before and/or during pregnancy	9%

More detailed response categories for each of these questions are available, and the data can be tabulated by age, race, or other characteristics reported on the survey.

A cooperative agreement with CDC provides most of the funding for PRAMS, though it is expected that the state's share of funding will increase over time. Other partners in North Carolina include the March of Dimes, Academy of Family Physicians, First Step Campaign, Healthy Start Foundation, Division of Medical Assistance, Women's and Children's Health Section, Office of Minority Health, and the University of North Carolina School of Public Health. There are PRAMS projects in 20 other states.

For more information about PRAMS in North Carolina, contact Judith Devine, PRAMS Project Coordinator, at (919) 715-4572 or judith.devine@ncmail.net. Also, visit our PRAMS web page at www.schs.state.nc.us/SCHS/about/programs/prams.html.

From the State Center for Health Statistics
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North Carolina Department of Health and Human Services

A Completely Efficient Life

Francis Henry Williams, MD, Pioneer Radiologist

Edward C. Halperin, MD

Francis Henry Williams was an American pioneer of clinical radiology. He was born in Oxbridge, Massachusetts on April 15, 1852, the son of Henry Williard Williams, an ophthalmologist, and Elizabeth Dewe Williams. In 1873, Francis earned a degree in chemistry from the Massachusetts Institute of Technology (MIT). He spent the following year on a world tour that included a visit to Japan as a member of the astronomy team of the United States Transit of Venus Expedition. Returning to studies in Boston, Williams received an MD degree from Harvard in 1877. He continued his medical studies over the next two years, in Vienna and Paris, returning to Boston in 1879 to launch what was to become a distinguished medical career.[1-5] Williams was one of the first physicians in Boston to teach medical students at the bedside. In 1892 he initiated bacterial examinations at the Boston City Hospital, and in 1894 he became the first in Boston to treat diphtheria with anti-toxin (Figure 1).[3]

His scientific training had him prepared when, in January of 1966, the *Boston Globe* reported Roentgen's discovery of the x-ray. Because of his strong interest in technology and many continuing contacts at MIT, Williams had access to the Institute's Rogers Laboratory of Physics where Roentgen's experiments were promptly reproduced. Williams fluoroscoped his first patient at the Rogers Laboratory and used x-rays to study pulmonary tuberculosis and other thoracic lesions within a few weeks of Roentgen's discovery.[2-3] Williams' first published x-ray picture appeared in the *Boston Medical & Surgical Journal* (now the *New England Journal of Medicine*) on February 20, 1896. Williams demonstrated the value of fluoroscopy before the Suffolk County District Medical Society in an auditorium at MIT on April 25, 1896.[3] Williams frequently worked in collaboration with his wife's brother-in-law, William Rollins, MD, DDS (1852-1929).

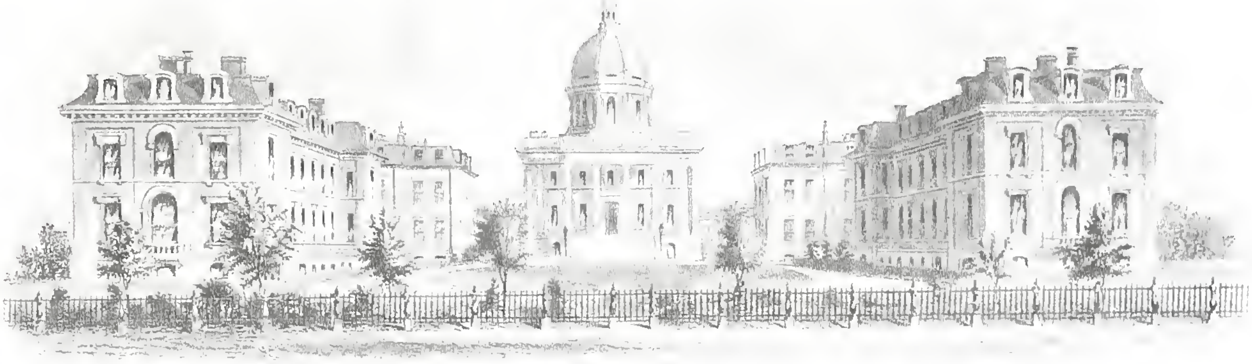

Figure 1. The main facade of the Boston City Hospital circa 1906 [From *A History of the Boston City Hospital*, edited by a committee of the hospital staff, Boston: Municipal Printing Office, 1906, frontispiece.]

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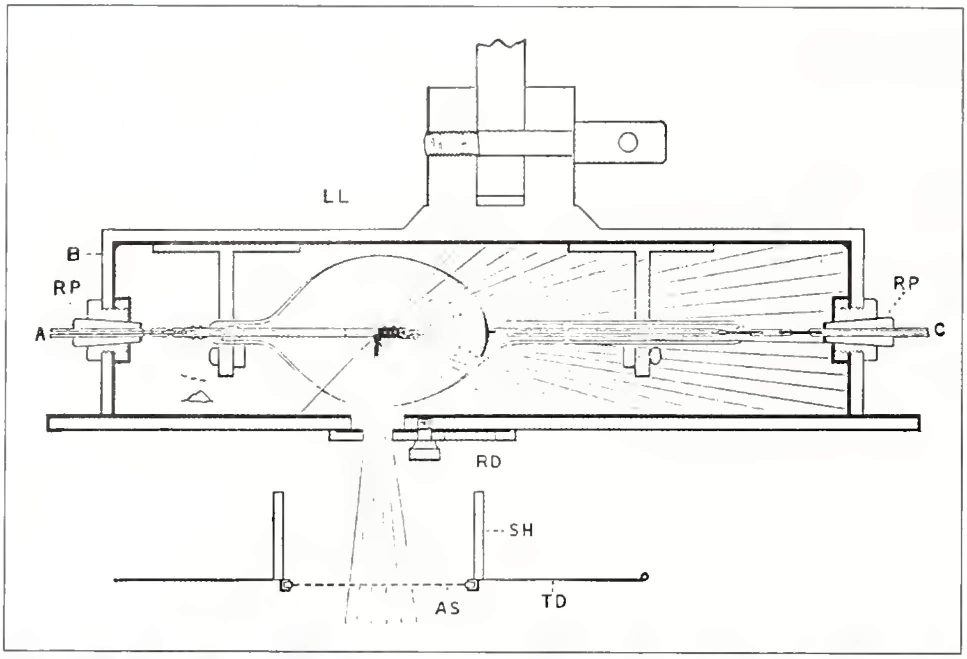


Figure 2. Williams' illustration of the Rollins box and the "formation of the cathode stream and x-rays. The cathode stream is represented by dotted lines, the x-rays by unbroken lines." The rays are stopped by the white lead lining (LL) except at the escape hole in the revolving diaphragm (RD) plate. [From Williams FH. *The Roentgen Rays in Medicine and Surgery*, NY: MacMillan Company, 1902, p. 38]

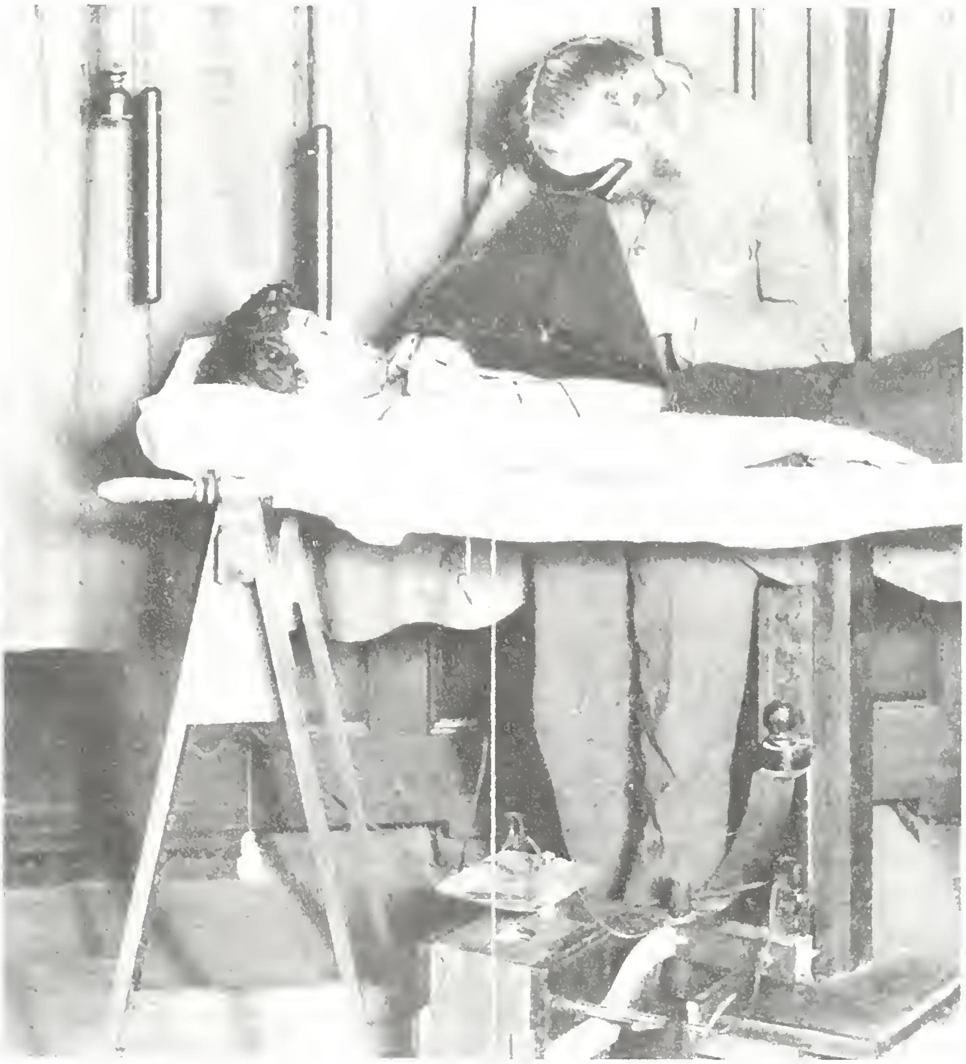
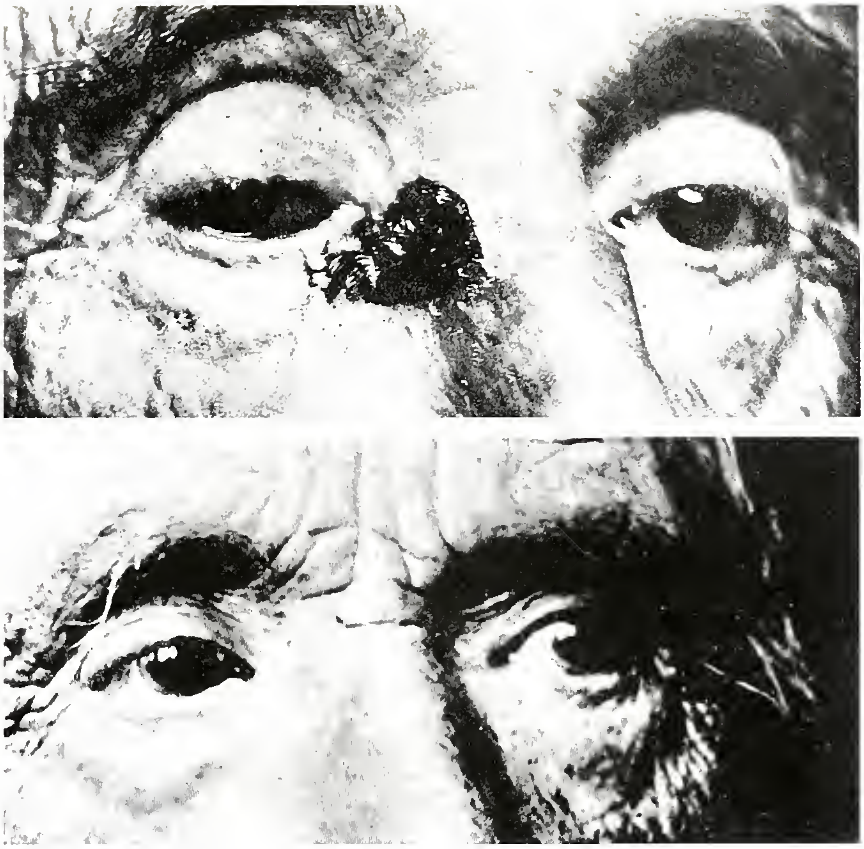


Figure 3. Williams demonstrates a method of drawing the outlines of intrathoracic structures on a patient's skin while looking through a fluoroscope. The "Rollins box" on the floor contains the x-ray tube. A meticulous writer, Williams took pains to point out to his readers that "the fluoroscope is held farther away from the patient than is necessary in practice, in order that the pencil which is under it may be shown in the picture. The observer usually stands on the patient's right, but in order to show the method of examination better he is seen standing on the patient's left. The diaphragm which is placed under the patient's chest in order to obtain a better definition of the outlines does not show in this cut." [From Williams, FH. The x-ray department at the Boston City Hospital in *A History of the Boston City Hospital*, edited by a committee of the hospital staff, Boston: Municipal Printing Office, 1906, p. 323.]

Rollins, a practicing dentist, was a gifted inventor. Williams and Rollins developed the "Rollins box," an x-ray tube in a wooden box lined with white lead. An opening in the box allowed a diagnostic beam of x-rays to escape. This improved x-ray shielding led Williams to point out the importance of avoiding "the very serious results that follow the use of x-rays at many other places [and which] involve the risk of finger, hands, arms, or even life itself." He noted the safety that could be achieved by "the use of simple and efficient means of protection which has been employed and advocated at [the Boston City Hospital]" (Figure 2).[6]

Williams invented the fluorometer, a device that compared the quantity and penetrance of x-rays issuing from a tube to those from a radium sample. His fluorometer, Williams wrote, allowed the "amount and kind of x-rays desired [to be] measured and applied, and therefore a definite dosage can be used of the kinds of rays adapted to this special patient. The value of the fluorometer is evident also for photographic work, as [at] the time of exposure any thickness of tissue can be more accurately determined when the amount and kind of light given out by the tube employed is known."[6] Williams and Rollins also developed the "see-hear" device, a fluorescent screen combined with a rubber diaphragm connected to a stethoscope. The device allowed simultaneous evaluation of intrathoracic sights and sounds.



Figures 4a and 4b. A 70-year-old man with a histologically proven "rodent ulcer" (probably a basal cell carcinoma) of fifteen years duration received 36 fractions of radiation therapy over 6 weeks. [From Williams, FH. *The Roentgen Rays in Medicine and Surgery.* NY: MacMillan Company, 1902, pp. 440-441.

Williams also collaborated with his brother, Charles Herbert Williams, an ophthalmologist, on an x-ray method of localizing foreign bodies in the eyes. And he worked with Dr. Walter Bradford Cannon (1871-1945) to evaluate the status of the gastrointestinal tract by administering subnitrate of bismuth to outline the gastrointestinal tract on a fluorescent screen. Williams and Cannon began their radio-opaque gastrointestinal studies in humans in 1899. Williams also was able to perform gastrointestinal studies by inflating the intestine with air.[1,3,7]

Williams worked under difficult conditions at the Boston City Hospital. In order to keep his static machines dry he had to keep them warm. As a result, in certain seasons the temperature of the x-ray department ranged between 95 and 100° F.[6] Because of his particular interest in thoracic radiology, he was among the first to describe the x-ray evaluation of pneumonia, cardiac size and movement, aneurysms, tuberculosis, pericardial effusion, cardiac hypertrophy, cardiac transposition, emphysema, pleurisy with effusion, pneumothorax, and hydrothorax (Figure 3).

Williams also made early observations about radiation therapy. He was among the first physicians in the United States to use radium therapeutically (Rollins had sent him a capsule containing a weak source of radium chloride with a suggestion that it might be useful). In 1903 Williams traveled to Europe and met with the famed French radiology pioneer Antoine Beclere (1856-1939) who was a great admirer of his. Beclere interrupted his summer vacation to visit with Williams and share information about the therapeutic uses of radium.[3] Williams brought 100 mg of radium bromide back with him and used it at the Boston City Hospital to treat a variety of benign and malignant diseases (Figure 4).[8,9]

Williams was a frequent contributor to the medical literature. In 1901, he published his textbook entitled *The Roentgen Rays in Medicine & Surgery, as an Aid in Diagnosis and as a Therapeutic Agent.*[8] Three editions eventually appeared, and Beclere personally translated the book into French. In 1935 Williams published *Radium Treatment of Skin Diseases, New Growths, Diseases of the Eyes, and Tonsils.* Williams, who died in 1936, was recalled by his contemporaries as a man of "sedate and dignified bearing with a touch of diffidence . . . the image of his tall figure, moving with its graceful strides through the wards of the Boston City Hospital or the wards of . . . [the] radiological department that he loved so well, makes a lasting imprint on the minds of those who are fortunate to have been contemporaries of his active and completely efficient life, and to learn much from him, both by precept and by example."[4]

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Correction: In the article on bioterrorism in our last issue [Smith CG, Veenhuis PD, MacCormack JN. Bioterrorism: a new threat with psychological and social sequelae. NC Med J 2000;61(3):150-63], "... the British supplied smallpox-vaccine-contaminated blankets to their Indian enemies" (p. 152) should read "...the British supplied smallpox-virus-contaminated blankets to their Indian enemies."

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A Woman with Anemia and a Failing Liver

Section of Gastroenterology
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SERIES MODERATOR: Walter Roufail, MD, Clinical Professor of Medicine
PRESENTER: Jeffrey A. Smith, MD, Gastroenterology Fellow
DISCUSSANT: Dr. Roufail

Dr. Smith: A 49-year-old woman was admitted to a hospital on December 23rd complaining of severe, progressive weakness for 4-6 weeks. She also reported recent, mild, left lower quadrant abdominal pain, nausea, vomiting, dark stools, and headache. She had a multinodular goiter and hypothyroidism, for which she took 0.075 mg of thyroxine daily. She had had a total abdominal hysterectomy with bilateral salpingo-oophorectomy, and took 0.625 mg of conjugated equine estrogens daily. Other medications consisted of bupropion, 150 mg once daily, and ibuprofen as needed. She smoked cigarettes and had accumulated 90 pack-years of use. She denied recent alcohol use, but had a history of daily, heavy use in the past. She had never used intravenous drugs. Her father had had lung cancer, and her mother had died of colon cancer at age 78.

Her physical exam was remarkable only for a temperature of 99.8, a multinodular goiter, and mild left lower quadrant abdominal tenderness. Initial laboratory tests showed a hemoglobin of 5.9 g/dL (normal, 14.0-18.0), mean corpuscular volume (MCV) 87 fL (80-94), white blood cell count (WBC) of 8,500 x 1000 (4.8-10.8) with a normal differential count, and a platelet count of 159,000 x 1000 (160-360). Reticulocyte count was 2.1% (normal, 0.5-2.5); erythrocyte folate concentration, >20 ng/dL (3.0-17.5); and serum vitamin B_{12} concentration, 520 pg/mL (210-705). Her total serum protein concentration was 5.8 g/dL (6.0-8.0); albumin, 1.8 g/dL (3.2-5.0); calcium 7.7, mg/dL (8.5-10.5); total bilirubin, 0.9 mg/dL (0.1-1.2); alkaline phosphatase (AP), 478 u/L (30-110); AST, 62 u/L (5.0-35.0); ferritin, 990 ng/dL (30-300); iron, 18 µg/dL (40-160); total iron binding capacity (TIBC), 186 µg/dL (230-500), saturation of iron binding capacity, 9.7% (20-50); prothrombin time (PT), 14 (10.8-13.9); partial thromboplastin time (PTT), 29 sec (<31). Her chest x-ray, urinalysis, and electrocardiogram were normal.

Gastrointestinal bleeding was postulated as the cause of her anemia and presenting symptoms. But colonoscopy was normal, and esophagogastroduodenoscopy revealed only non-bleeding erosions in a small hiatal hernia and punctate hemorrhages in the body of the stomach. Thereafter, the patient

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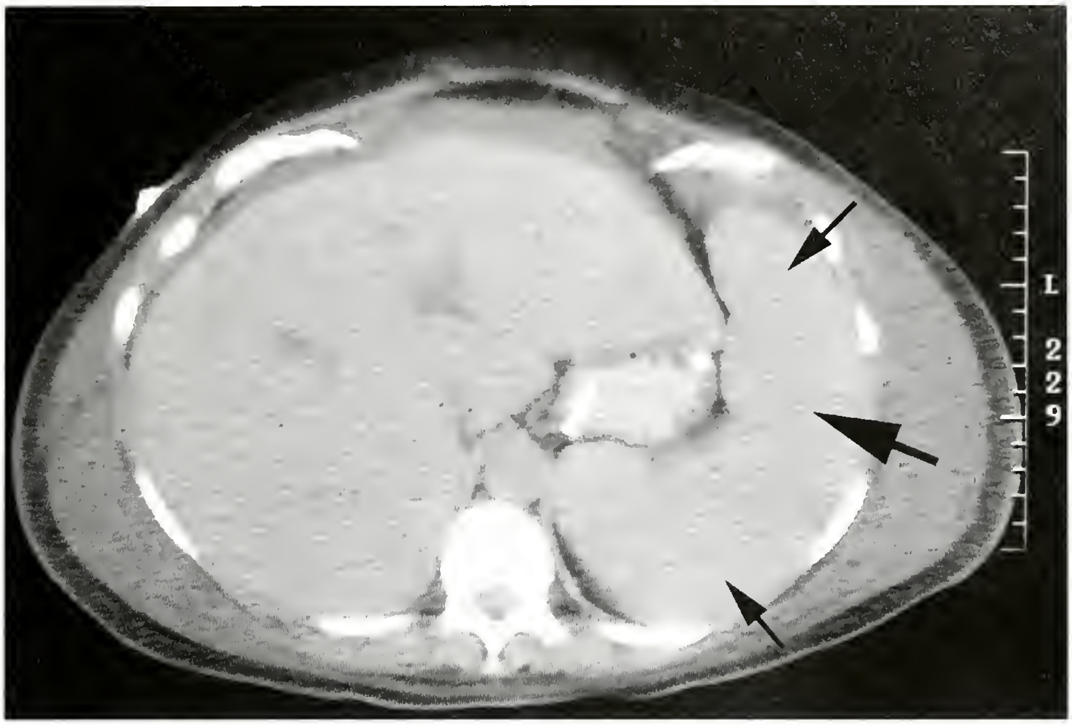

Figure 1. Initial abdominal CT scan, showing enlarged spleen (arrows).

developed constant right upper quadrant pain, and fevers to 103° F. After blood transfusion her hemoglobin concentration rose to normal levels, but then drifted down to 8.2 gm/dL. Her platelets dropped to 62,000 x 1000, AP increased to 580 u/L, and the total bilirubin rose to 4.2 mg/dL. An abdominal ultrasound showed small gallbladder polyps, but no stones, no biliary tract dilatation, and a normal liver, spleen, pancreas, and kidneys. She was started on intravenous cefotaxime. On December 27th she was transferred to a second medical center for evaluation of her presumed gastrointestinal bleeding, possible cholecystitis/cholangitis, and worsening thrombocytopenia.

At the second hospital, he serum alkaline phosphatase was 609 u/L, total bilirubin 5.8 mg/dL, AST 83 u/L, WBC 8.6 x 1000 with 73% neutrophils, 6% band forms, 20% lymphocytes, and 1% monocytess. Cefotaxime was discontinued in favor of intravenous imipenem. A haptoglobin screen was positive. Because of concern about possible biliary obstruction, the patient underwent endoscopic retrograde cholangiopancreatography (ERCP). The biliary and pancreatic ducts were normal except for a possible filling defect in the distal common bile duct. A computed tomographic (CT) scan of the abdomen demonstrated fluid around the right hepatic lobe, a small right pleural effusion, mild splenomegaly, and a normal liver and gallbladder. An abdominal sonogram revealed a small (4x5 cm) collection of fluid in the left lower quadrant, but was otherwise normal. Because of persistent fevers, worsening jaundice and thrombocytopenia, the patient was transferred to our care on December 28th.

On our review, she recalled right upper quadrant pain, sweats and chills for several weeks that had preceded her initial hospitalization. She had recently noticed dyspnea on exertion, worsening jaundice, and a mild rash on her left groin and thigh. On physical examination, her temperature was 101.6° F; she had jaundice, decreased breath sounds and dullness to percussion over the right lower thorax, diffuse abdominal tenderness greater in the upper abdomen, a positive Murphy's sign, and bilateral leg edema. Her hemoglobin was 9.2g/dL; WBC, 6,700 x 1000 with 81% neutrophils, 10% band forms, and 6% lymphcytes. Total and direct serum bilirubin were 11.6mg/dL and 8.5 mg/dL, respectively. Alkaline phosphatase was 412 u/L; ALT, 28 u/L; and AST, 73 u/L. Because of the abnormal liver function tests and the apparent filling defect in the distal common bile duct, the patient ERCP was repeated; the biliary and pancreatic ducts were normal, with no filling defects.

Dr. Roufail: This long and complicated case challenged the diagnostic acumen of physicians at three hospitals. I, fortunately, have the advantage of a retrospective view of her clinical course as well as the laboratory, imaging, and endoscopic findings up to this point. We can look at her case from three different aspects:

Clinical Course This woman presented with 6–8 weeks of relatively constant right upper quadrant abdominal pain, chills, sweats and profound weakness, worse over the past 4 weeks. We have at least one documented temperature to 103° F. On physical examination, there was generalized abdominal tenderness, and one observer elicited a positive Murphy's sign suggesting gallbladder disease or other RUQ abnormality. An abdominal CT scan done in the second hospital suggests mild splenomegaly and a small right pleural effusion (Figure 1). On the basis of her clinical course alone, I would categorize the case as one of chronic abdominal pain of undetermined origin with fever of undetermined origin. The fact that she did not respond to two potent, broad-spectrum antibiotics argues against a common infection. The patient's history does not suggest immunodeficiency, so unusual organisms are most unlikely to have produced this kind of picture. Sporadic infections with cytomegalovirus, herpes simplex or Epstein-Barr viruses would be unresponsive to the given antibiotics; they are rare, but cannot be dismissed on the basis of the clinical course alone. A few other possibilities come to mind: infiltrative lesions such as sarcoidosis or lymphoma; inflammatory diseases, particularly Crohn's disease; or collagen vascular diseases. Another rare entity, Whipple's disease, should have responded to the given antibiotics, but could have recurred because only a short course was prescribed.

Anemia At initial presentation, the patient's hemoglobin was 5.9 g/dL, and anemia certainly explains some of her symptoms. Her MCV was 87 fL, compatible with the normocytic anemia of bone marrow suppression. Her WBC and platelet counts were originally normal, but she subsequently developed recurrent and significant thrombocytopenia. Her WBC remained within normal limits.

Her anemia prompted a search for gastrointestinal bleeding. This was definitely appropriate, particu-

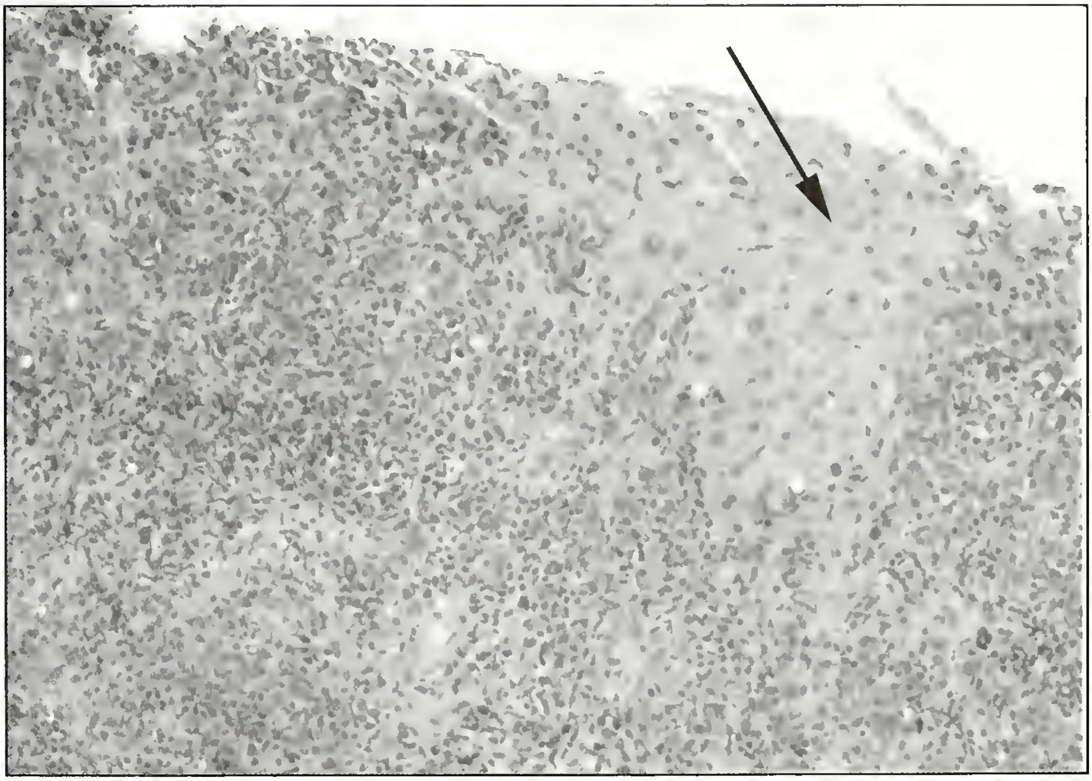

Figure 2. Percutaneous liver biopsy. There is almost complete replacement of the normal liver parenchyma (arrow) with lymphocytes.

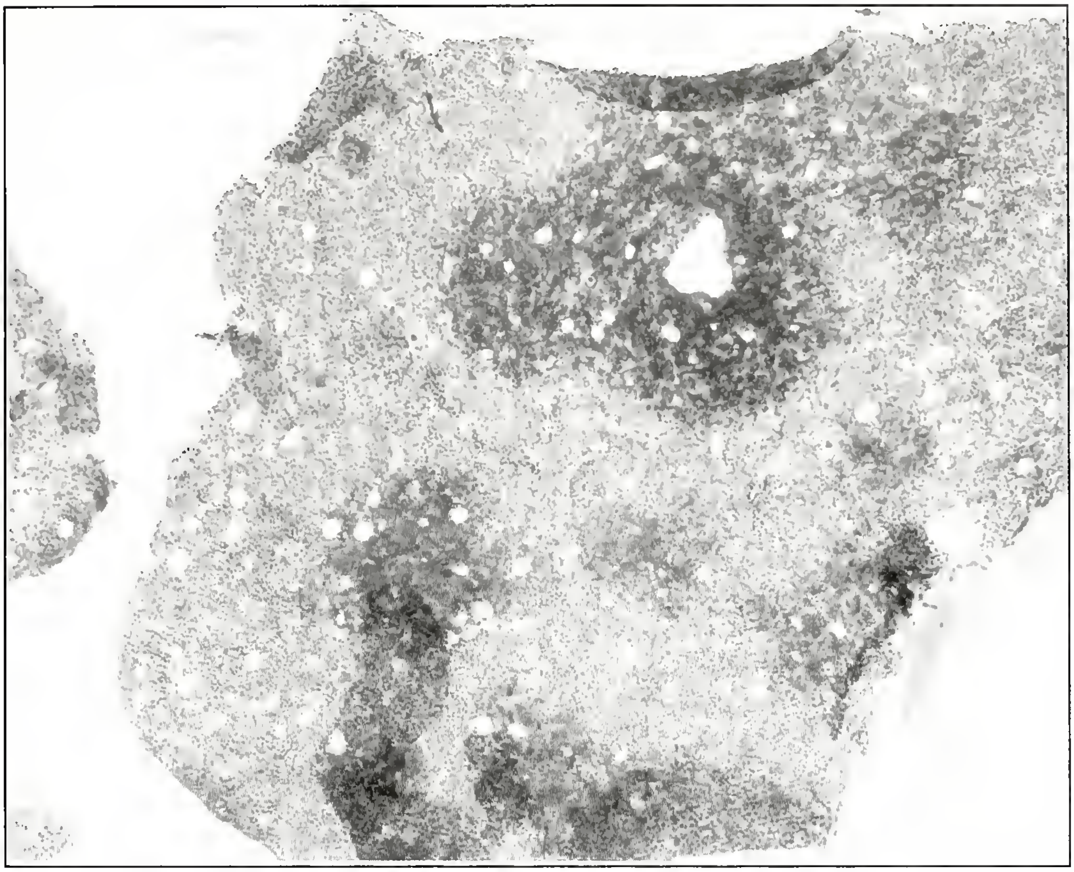

Figure 3. Bone marrow biopsy stained with the B-cell marker CD-20 immunoperoxidase stain. The dark foci represent lymphoma within the marrow.

larly with the history of a first degree relative with carcinoma of the colon. No cancer was found by colonoscopy or esophagogastroduodenoscopy. The positive haptoglobin screen suggests a possible hemolytic component. The normal reticulocyte count (2.1%) in the face of severe anemia could be explained by recent alcohol abuse (which the patient denied) progressive cirrhosis and hypersplenism, or an infiltrative process in the bone marrow resulting in reduced hematpoiesis and platelet formation. I lean towards the latter.

Abnormal Liver Function Tests From the beginning of her illness the patient's liver function tests pointed toward an obstructive rather than hepatocellular pattern. The progressive rise in bilirubin (mostly direct reacting) and alkaline phosphatase, with normal or only slightly elevated transaminases, points to a rapidly progressive, obstructive process. However, two ERCPS failed to reveal any extrahepatic obstruction, and the gall bladder was normal by ultrasound. This leaves us with the broad diagnosis of intrahepatic cholestasis. None of the drugs she had been taking could be implicated in this picture. I am sure that Dr. Smith ordered other laboratory tests to rule out other etiologies such as primary liver disease and progressive cirrhosis.

Dr. Smith: Further laboratory tests included serum levels of hepatitis B and C antibodies; anti-smooth muscle antibody, and anti-nuclear antibody to evaluate for auto-immune hepatitis; human immunodeficiency virus antibody; serum ceruloplasmin to evaluate for Wilson's disease; and anti-mitochondrial antibody to evaluate for primary biliary cirrhosis. All of these tests were negative or within normal limits.

Dr. Roufail: In view of all the data given to this point, I do not believe the patient is suffering from active cirrhosis with hypersplenism. The clinical picture, particularly the daily fever and night sweats, the complex anemia and thrombocytopenia, as well as the cholestatic picture of her liver tests would suggest to me an infiltrative process involving both the liver and the bone marrow. A lymphomatous process would be my first choice. Sarcoidosis or carcinomatosis from an unknown primary site would be a distant second or third choice. I would recommend a liver biopsy or bone marrow biopsy (or both) at this time.

Dr. Smith: Gastroenterology and Hematology consultants recommended liver and bone marrow biopsies. The pathology specimens revealed non-Hodgkin's lymphoma, large cell type, B-cell phenotype, involving the liver (Figure 2) and bone marrow (Figure 3). Chest, abdominal, and pelvic CT scanning showed no other obvious lymphomatous involvement. The patient was started on VP-16 and vincristine. Unfortunately, her condition rapidly deteriorated and she died on January 11th.

CLINICAL DIAGNOSIS: Lymphomatous infiltration of liver and bone marrow.

FINAL PATHOLOGIC DIAGNOSIS: Large cell non-Hodgkin's lymphoma, B-cell phenotype.

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Where We Stand with Treating Dementia

Luis Amador, MD, and Kandaswamy Jayaraj, MD

Dementia is an acquired cognitive deficit that profoundly interferes with personal, social and occupational functioning. It is a pervasive condition, devastating to both victims and their families. There are many causes of dementia, and in rare instances it can be reversed with treatment, but most of the time it is progressive and irreversible.[1]

Dementia represents a large and growing economic burden for society. At least four million Americans are affected with the most common form of dementia, Alzheimer's disease (AD). By age 60, about 1% of the population has AD, and the prevalence doubles every five years thereafter.[2,3] Even these figures underestimate the true prevalence because in its earliest stages AD does not cause enough functional impairment to prompt diagnosis. The costs of AD are considerable (over $110 billion a year[4,5]); taking into account that the American population is aging, AD will have an even greater impact on the national health care in the near future.

In addition to the social and economic problems it produces, the cognitive impairment of dementia affects patients' ability to perform activities of daily living (ADLs), thereby impairing quality of life of the patients and their families. Dementia interferes with performance of both basic ADLs (walking, bathing, feeding, toileting, dressing, and transfer) and instrumental ADLs (using the telephone, shopping, driving, taking medication, and managing finances). AD is a progressive disease, and can range from a subtle cognitive deficit to a completely dependent and bedridden state. Death usually follows aspiration secondary to impaired swallowing at seven to ten years after initial diagnosis.

The severity of dementia correlates with loss of inability to perform the ADLs. In the early stages dementia is associated with mild impairment in instrumental ADLs; as the disease progresses, basic ADLs become impaired. The progressive nature of functional and cognitive loss in dementia means that a single test such as the Mini-Mental State Examination cannot reliably be used to judge disease severity. On the other hand, cognitive tests are useful for screening and following patients with cognitive impairment.

Alzheimer's disease can be classified as mild, moderate, severe, and terminal/end-stage. Patients with mild disease usually have minimal deficits in instrumental ADLs such as finance management. In those with moderate AD, both instrumental and basic ADLs are affected. Finally, in severe and end-stage AD, the patient cannot transfer from bed to chair and has swallowing impairment. There is no evidence that parenteral nutrition improves survival or quality of life.

Diagnosis

Dementia is a clinical diagnosis. Patients should have a thorough review of their medical history, a careful physical and mental status examination, and some additional ancillary testing (blood tests and, on occasion, brain imaging). The history should be obtained from both patient and the family or caregiver. Conditions that mimic dementia such as delirium and depression should be excluded because their treatment is different (see Table 1). Delirium is an acute condition, common in the hospitalized. It differs from dementia in its sudden onset (symptoms usually evolve over hours to days) and the presence of a precipitating event. Delirium is characterized by the presence of clouded concentration with reduced ability to focus, sustain, or shift the attention, and fluctuating consciousness. Drug intoxication can cause delirium, so all medications and their doses, including over-the-counter medications, should be reviewed. Common medications causing cognitive impairment in the elderly include analgesics, anticholinergics, antihypertensives, psychotropics, and sedative-hypnotic agents.

The cost effectiveness of laboratory testing has not been well studied, but testing to find some treatable causes of dementia (Table 2) seems reasonable. These tests include a complete blood count (looking for anemia or macrocytosis as a sign of vitamin B_{12} deficiency or hypothyroidism), blood-

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chemistry panel (looking for electrolyte imbalances such as hypo- and hypernatremia, hypercalcemia, uremia, and hypoglycemia), thyroid function tests (because hypothyroidism may resemble dementia), measurement of vitamin B_{12} level (deficiency may seriously impair mentation), and screening for inflammatory and infectious brain diseases such as neurosyphilis.[6,7] Depending on findings from the history and physical exam, additional tests may be required. Genetic testing (for example, of lipoprotein Apo-E genotype) is controversial, poses complex ethical problems,[8,9] and has not been proven to be helpful except in some cases of pre-senile (<65 years old) dementia. Special tests (screening for human immunodeficiency virus infection, cerebrospinal fluid analysis, electroencephalogram, or sleep studies) are indicated only in special cases. Radiographic brain imaging and neuropsychological testing are occasionally necessary. Neuropsychological testing may be helpful when history and other studies are inconclusive.

Computed tomographic (CT) or magnetic resonance imaging of the brain is useful in patients who have had rapid cognitive decline (over the course of 1-2 months), or have had symptoms for less than two years (see table 2 for more indications).[10] Diagnosis of dementia often requires more than one office visit; continued follow-up and reevaluation will provide valuable information regarding the disease process.

Table 1. Common causes of dementia

- Degenerative disorders
    - Alzheimer's disease
    - Frontotemporal dementia (Pick's disease)
    - Lewy body dementia
- Vascular dementia
    - Binswanger's disease (white matter infarcts)
    - Strategic infarct (occlusion of thalamoperforant arteries)
    - Multiple large vessel occlusion
    - Mixed vascular (large and small vessel)
- Metabolic disorders
    - Hepatic encephalopathy
    - Endocrine disturbance (especially hypothyroidism)
    - Porphyria
    - Vitamin deficiency states (especially vitamin B12)
    - Uremic encephalophaty
- Toxic conditions
    - Medications
    - Alcohol
    - Heavy metal intoxication
- Other causes
    - Normal pressure hydrocephalus
    - Central nervous system infection
    - Neoplastic and paraneoplastic disorder
    - Traumatic dementia
    - Myelin disorder
    - Inflammatory disorder

Table 2. Laboratory and imaging evaluation of dementia

- Screening labs
    - Complete blood count
    - Blood chemistry panel
    - Thyroid function tests
    - Vitamin B12 level
    - VDRL/RPR
- Other labs (depending on history and physical examination findings)
    - HIV serology
    - Lead levels
    - CSF analysis
- CT scan of head (for the following indications)
    - Rapidly progressive cognitive decline (over 1-2 mos.)
    - Duration of symptoms <2 years
    - Age <60
    - Unexplained neurological symptoms or signs
    - History of cancer
    - Head trauma
    - Anticoagulation
    - Gait disturbance
    - Unusual or atypical cognitive impairment
- Genetic testing
    - Rarely necessary; presently used for research purposes

Managing the Demented Patient

Once diagnosis is established, it is essential to target the treatment toward preventing further deterioration. Management should address the following four issues: (1) identification and treatment by etiology; (2) treatment of coexisting or exacerbating illnesses; (3) treatment of behavioral problems and cognitive dysfunction; and (4) management of caregiver burden if possible. The goals of treatment are to improve or preserve the quality of life of the patient and the family or caregiver, to improve behavioral problems and capacity to perform the ADLs, and to slow the progression of the disease.

Alzheimer's disease: AD accounts for more than half the cases of dementia in the elderly.[3] This degenerative brain disorder produces gradual deterioration in mental function. Predisposing factors include a family history of the disease, aging, estrogen deficiency, prior head injury, and the presence of the lipoprotein ApoE-4 allele. Biochemically, AD is characterized by a loss of presynaptic cholinergic function in the brain, particularly in the nucleus basalis [11-13] The brain in AD accumulates abnormal beta amyloid protein, which forms characteristic histopathological lesions called senile plaques and neurofibrillary tangles. The CT scan shows a loss of brain volume with widening of the sulci.

Soon after AD is diagnosed, the doctor should have a detailed discussion with patient and family, to explain the diagnosis, the likelihood of progression, and the management plan. Social workers and support groups can help in the educational process. If not already available, a signed advance directive or a durable power of attorney should be obtained. Preventive measures should include assessment of driving skill and judgment. Some patients may need a formal competency evaluation and assessment of judgment by a psychiatrist.

Unfortunately, only few medications are available for the treatment of AD and their therapeutic value is limited. The Food and Drug Administration has approved the acetylcholinesterase inhibitors: donepezil (Aricept) and tacrine (Cognex) for use in patients with established, mild-to-moderate AD. AD is associated with depletion of brain acetycholine, and these drugs increase acetylcholine and cholinergic activity by blocking the acetylcholinesterase enzyme. One 24-week randomized, double blind, placebo-controlled study showed that donezepil produced a statistically significant improvement in cognitive and functional scores compared to placebo. Donepezil treatment led to improved scores on both the Alzheimer's Disease Assessment Scale (which assesses cognition) and the Clinician's Interview Base Assessment of Change-Plus scale (which assesses information reported by caregivers).[14] Patients were randomly assigned to treatment with placebo, 5mg/d, or 10mg/d of donepezil. The 10mg dose produced marginally better results but had more dropouts because of side effects. At the end of 6 weeks there was no significant difference between the groups, but there was at 12,18, and 24 weeks. Donepezil is begun at 5mg daily and, if tolerated and there is a response, can be increased to 10mg/day. The initial response can take as long as 6 weeks in some cases, but if the drug is effective, cognitive or functional response should been seen within three months. It is still not clear how long to continue treatment in those who do respond; some physicians feel that a mere lack of deterioration while on treatment is enough of a response to merit continuation. Donepezil is safer than tacrine because it has no hepatotoxicity, and it has a longer duration of action, but it should be used with caution in patients with history of bronchospasm, bradycardia, or seizure disorder. Common side effects include anorexia, nausea and diarrhea. Rivastigmine, a new cholinesterase inhibitor, was found to be well tolerated and effective in a European study.[15] It is currently being studied in the US.

Antioxidants (like vitamin E), selegiline, estrogen and anti-inflammatory agents are being investigated as potential agents to slow the progression of AD. A number of other drugs (*Ginkgo biloba*, muscarinic agonists, antiamyloid substances, and methanesulfonyl fluoride) have been proposed as treatments, but we need more evidence about their mode of action and effectiveness before endorsing their use in AD.[16,17]

Vascular dementia: Ischemic, hypoxic, or hemorrhagic brain damage can produce sufficient intellectual decline that the patient cannot function appropriately. This condition is called vascular dementia, and its diagnosis is suggested by a history of transient or established focal weakness, dizziness, or other neurological signs suggesting stroke. Depending on the area(s) of the brain affected, clinical presentation can vary from psychomotor slowing with memory loss, executive dysfunction, and apathy (Binswanger's disease) to aphasia, amnesia, apraxia, and agnosia (multi-infarct dementia).[5] On occasion, AD and vascular dementia coexist.

A number of factors increase the risk of cerebrovascular disease (Table 3). Appropriate intervention may lessen these risks and prevent further deterioration in mental function. Unless there are contraindications, patients with vascular dementia should be treated with aspirin to forestall further stroke.[18,19] Patients who cannot tolerate, or are unresponsive to, aspirin can be treated with ticlopidine or clopidogrel.

Table 3. Risk factors for dementia (and treatments)

Risk factors	Treatment
Hypertension	Antihypertensives
Smoking	Smoking cessation
Diabetes mellitus	Good glycemic control
Atrial fibrillation	Warfarin
Recent TIA or stroke	Aspirin or other as indicated

Other Dementias: Frontotemporal, Lewy body dementia, and normal-pressure hydrocephalus-related dementia differ from AD in their clinical manifestations. Frontotemporal dementia (Pick's disease) initially involves the anterior part of the brain, so patients usually present with behavioral and personality change rather than cognitive decline.[20] These patients can be difficult to treat and may need the services of a neurologist, psychiatrist, or geriatrician skilled in treating dementia.

Lewy body dementia is classified by some authorities as a subtype of AD, but its clinical features differ. Patients suffering from Lewy body dementia are more likely to have complex visual hallucinations, auditory hallucinations, paranoid delusions, falls, and extrapyramidal signs. These patients are very sensitive to neuroleptic drugs (haloperidol, thioridazine, promazine and others) and are at high risk for morbidity and mortality if drugs of this type are used.[21,22]

It is not clear how normal-pressure hydrocephalus causes dementia, but it usually produces a triad of symptoms: gait disorder, urinary incontinence, and cognitive decline. In most cases, gait disorder appears first, followed by urinary incontinence and then cognitive dysfunction. Diagnosis can be confirmed by measuring the diffusion of radioisotope tracers in the cerebrospinal fluid, and by the Miller Fisher test (objective gait assessment before and after removal of ap

Table 4. Nonpharmacological measures for disruptive behaviors

Behavior	Example	Suggested measures
memory disturbance	losing things, repetitive questions	posted daily activities, clocks, calendars, caregiver education, use of memory aids
agitation/restlessness	irritable behavior, pacing, uncooperativeness with care, fidgeting	relaxed, friendly approach; simplified environment; soft music; exercise; avoidance of sensory overload; diversion of patient's attention
wandering	getting lost	fenced yard, locked doors and windows, identification bracelet, informed neighbors and family, removal of environmental hazards
reversal of day/night sleeping patterns	sleepy during day, restless at night; awakens often during night	daily exposure to bright sunlight; accessible, well-lit bathroom; daily exercise; decreased sleep time; appropriate clothing day and night; small snack at sleep time; fluids restricted before sleep; night lights; undisturbed sleep at night
verbal agitation	yelling, shouting	redirection, simplifying tasks, therapeutic touch; relaxed and friendly communication
delusions	belief that spouse is an imposter	education of family and caregivers, patience and redirection
physical violence	slapping, hitting, pushing,	removal of potential weapons, distracting attention

proximately 30ml of spinal fluid). The Miller Fisher test is considered positive if the gait improves after spinal fluid is removed. A ventriculoperitoneal shunt may improve the symptoms or at least arrest their progress.

Treating Symptoms in the Demented Patient

Since dementia is largely a disease of the elderly, affected patients tend to have multiple co-existing medical problems, but cognitively impaired patients may not offer complaints about these problems. This can make the treatment of dementia a challenge, since we do not want to worsen any coexisting conditions.

Dementia-related symptoms that may need treatment include urinary or fecal incontinence, sleep disturbance, pressure ulcers, infections, falls, delirium, malnutrition, immobility, or seizures. These conditions are treated as in non-demented patients, but with specific attention to possible medication-related side effects (especially, anticholinergic effects) that might worsen cognitive function. Any decision to treat must take into consideration possible advantage and disadvantage, predicted life span of the patient, quality of life, personal wishes, and the wishes of the family.

Behavioral Problems: The first step in treating behavioral problems is to identify and treat any medical conditions (such as depression, infection, pain, hunger, or constipation) that might be triggering the problem behavior. If there is no clear precipitant, non-pharmacological treatments are the first choice in the management (Table 4). Drugs (Table 5) may be necessary, but close patient follow-up is essential. Once the behavior improves, drug doses should be minimized to avert adverse effects.

Depression: It is true that many demented patients are depressed, and also that the symptoms of depression itself can mimic dementia (so-called "pseudo-dementia" of depression). The clinician must always be alert to the possibility of depression, especially in patients with atypical manifestations of dementia such as agitation, weight loss, anxiety, and resistance to care. It is important to assess the risk factors of depression such as personal or familial history of depression, or a recent adverse event (loss of a family member or friend or change in environment) [23]. Diagnosis can be challenging, especially when the patient has communication problems. Selective serotonin re-uptake inhibitors (SSRIs) are the medications of choice in elderly patients with depression. They are effective and their side effect profile is good when compared to other antidepressants. As usual in the elderly, begin with a low dose and advance slowly.

Caregiver Burden: Caring for demented patients can be highly stressful and can lead to significant psychological and physical morbidity in caregivers.[24] Caregivers play an important role in the treatment of these patients, and they form an

Table 5. Drugs used to treat disruptive behaviors

Drug class	Example	Indications	Side effects
neuroleptics	Haloperidol (high potency) Thioridazine (low potency)	psychotic symptoms	low potency: sedation anticholinergic effects; high potency: extrapyramidal effects
benzodiazepine	Oxazepam	agitation, anxiety, insomnia	paradoxical excitation, sedation, ataxia, falls, confusion
SSRI	Citalopram Fluoxetine Paroxetine Sertraline	anhedonia, crying spells, change in eating or sleeping habits	nausea, weight loss, diarrhea (fewer GI side effects with Citalopram)
other serotoninergic	Buspirone	agitation/anxiety	dizziness, headache,
	Trazodone	agitation especially at night, insomnia	sedation; gastrointestinal symptoms, hypotension
anticonvulsant	Carbamazepine	impulsivity, aggression	dizziness, hepatotoxicity, leukopenia, rashes

essential part of the care team. Caregivers may feel overwhelmed, depressed, anxious, fatigued, or angry. They should be educated about the availability of support groups, respite and day care. Web pages like http://www.alz.org have useful information for family and caregivers.

Summary

Our aging population is growing. As a result, dementia is becoming an ever more prevalent problem - with devastating consequences to the affected persons and their families. In the evaluation of the demented patient, it is crucial to look for and exclude conditions such as depression and other reversible causes of cognitive impairment before branding the patient with a diagnosis of dementia. Drug treatment of AD is not highly successful, although the Food and Drug Administration has approved acetylcholinesterase inhibitors for the treatment of mild to moderate AD. Present-day treatment for dementia focuses mainly on improving or preserving the quality of life of patients and their families, and on treating concomitant psychosocial, behavioral, and medical issues. We are optimistic that new, innovative medications may in the future allow us to treat or even cure Alzheimer's disease and other progressive dementing disorders.

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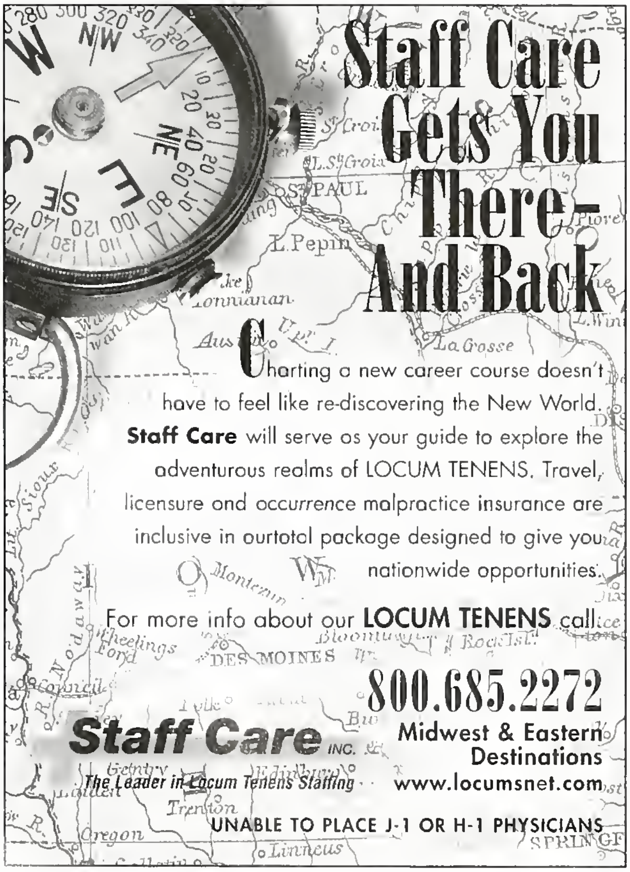

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"There's No Place Like Home"

The Neonatal Home Management Program, Carolinas HealthCare System

Lori Sellers, RN, BSN, Michael J. Davidson, MD

Every year in the United States more than 300,000 babies are born weighing less than 5.5 pounds. These low birthweight babies are America's most vulnerable children. Their parents and families face long and costly hospitalization, along with the medical problems that often accompany premature birth. The result is high anxiety and stress; prolonged separation of parents from infant; a sudden, unexpected change in parenting roles; and great expense.[1] Few families have the money or the support at home to cope with caring for a premature infant. In addition, a long hospital stay and the behavioral characteristics of the premature infant may adversely affect the day-to-day functioning of the family.[2]

Carolinas HealthCare System (CHS) cares for nearly 1000 low birthweight infants a year. The 83 neonatal beds at Carolinas Medical Center, Mercy Hospital South, and University Hospital provide trained neonatologists and nurses with state-of-the-art equipment. Over the last several years, it has become clear that even this high-level care does not offset the negative impact of long hospitalization, daily visits to the hospital, and sibling separation. Still, it has been difficult to discharge infants sooner because most parents lack the education, preparation, and support needed to care for low birthweight infants at home. The Neonatal Home Management Program (NHMP) was conceived to address these shortcomings. The idea was that with early involvement families would be able to gain the knowledge and confidence needed to care for their babies at home. Furthermore, physicians, administrators, managed care organizations and, most importantly, the families of involved neonates would embrace a program that could improve the health of the low birthweight infant while simultaneously decreasing health care costs. We describe here the program that evolved.

The Neonatal Home Management Program

The CHS Neonatal Home Management Committee (Committee) was made up of neonatologists, neonatal nurses, social workers, chaplains, respiratory therapists, and home health care nurses. The Committee first outlined criteria that would identify neonates and parents capable of coping with early discharge. These included the following: neonates had to weigh less than 5 pounds, have a gestational age of less than 36 weeks, demonstrate infrequent apnea and bradycardia, be able to maintain body temperature, and show steady weight gain; parents had to provide an "appropriate" home environment, and be motivated and willing to care for a low birthweight infant at home.

The Neonatal Home Management Team. One barrier to early discharge of premature infants was the lack of specialized neonatal home care nurses. In collaboration with a home care agency (Carolinas Home Care), several Neonatal Intensive Care Unit nurses were selected from a group of interested and motivated candidates. To become a member of the neonatal home management team, nurses had to have 3-5 years of experience in neonatal nursing and excellent communication and leadership skills. Candidates, selected after interview by members of the Committee, completed 40 hours of specialized classroom and in-home training.

The trained neonatal home management nurses visit the family's home several times a week for approximately 3 weeks after the neonate is discharged (additional visits are scheduled if needed). At each visit the nurse examines and weighs the infant, evaluates its feeding status, and assesses the home environment. The nurse also assesses the family's emotional status and provides ongoing teaching, counseling, and sup-

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Table. Neonatal Home Management Program critical quality indicators

1. Infant's gestational age at hospital discharge
2. Infant's hospital discharge weight
3. Infant's daily weight gain at home
4. Continuing, in-home education of families on the care of their infants
5. Number of phone calls made by family to Neonatal Home Management Nurse
6. Number of unscheduled pediatrician appointments
7. Number of Emergency Department visits
8. Infant readmitted within 31 days of discharge
9. Percent "excellent" ratings on Neonatal Home Management satisfaction survey

port. A home management nurse is on call for consultation 24 hours a day. This facilitates communication with families and decreases their anxiety and sense of isolation. The home management nurse becomes the link between the family, the neonatologist, and the pediatrician, thus enhancing the continuity of care.

Program Implementation. In July 1998, the neonatal home management nurses and neonatologists began to select candidates for the Program. Once both the attending neonatologist and the family agreed, an individualized plan of care was developed and put in place. The family learned basic infant care, cardiopulmonary resuscitation techniques, the use of a cardiorespiratory monitor, and use of home oxygen. If appropriate, the family learned to give medication and to perform special procedures such as ostomy care. The Neonatal Home Management Nurse spent as much time teaching as needed to achieve family comfort and confidence in performing all tasks independently. Teaching was documented on an individualized care plan that accompanied the infant home. At home, the neonatal home management nurse reviewed the care plan with the parents and provided continuing education and instruction as needed.

How Has the Program Done?

The Program has shown real performance improvement based on critical quality indicators (Table) that focus on the status of patient and family in hospital and at home. In 1997, before the Program began, low birthweight infants were kept at Carolinas Medical Center until they weighed an average of 5 pounds. During the first year of the Program there has been a continuing trend downward, so that patients are now discharged at an average weight of 4 pounds (Figure 1). In 1997, the average gestational age at discharge was 38 weeks; since implementation of the Program, infants are discharged at 34-35 weeks gestational age, a 3.5-week decrease in hospitalization!

The ability to gain weight at home was identified as a critical indicator of the health status of the infant (Table). Neonates discharged on the Program gained an average of 46.5 grams/day at home, compared to an average of 30 grams/day in hospital (Figure 2), a 55% improvement.

Since July of 1998, 150 neonates and their families have been enrolled in the Program, and the numbers have increased from 12 in the first quarter of the Program to 30 in the most recent quarter. The success and good results from the Neonatal Home Management Program have generated more participants than anticipated (100 patients during the first year, rather than the projected 20).

Hospital readmission serves as a critical quality indicator. During the first year of the Program (July 1998 to July 1999), no infant required readmission. This compares favorably to other programs like ours, which report readmission rates of 4-9 %.[3,4] During the first 6 months of the second year of the program, we enrolled another 50 infants, one of whom was readmitted for "social" reasons.

The impact of the new service became apparent after only a few families had been enrolled. A satisfaction survey showed the appreciation of parents and families. Before the Program was implemented, 90% of parents rated care as "excellent"; after the Program was in place, this rose to a consistent 97%. Families look forward to the visits of the neonatal home management nurses, and rely heavily on their expertise. One grateful mother described her experience as follows:

> *It is with very mixed emotion that I greet this day. I am elated that M will be discharged from the program as this means she is well and strong. I am grateful as I realize that I am now on my own. Most of all I am saddened by this day and the end of your visits. You have become part (in fact the most important part) of Maggie's and my life. Your visits have provided me with guidance, support, and confidence in my ability to be a mother to my daughter... [Y]ou have provided professional care and love!*

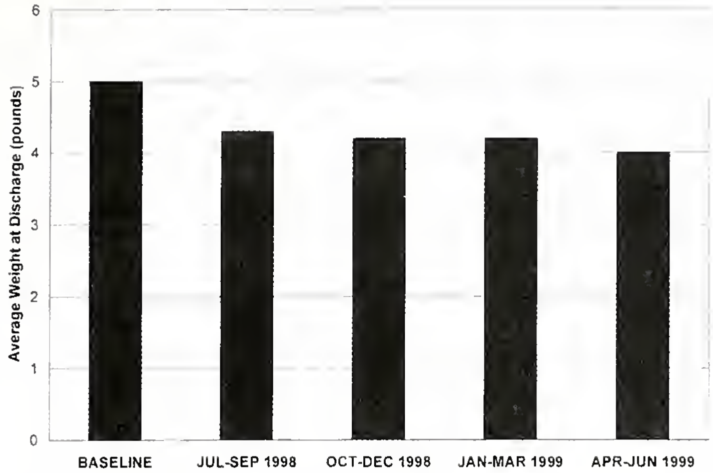

Figure 1. Neonatal Home Management Program critical indicator: average weight at discharge (pounds)

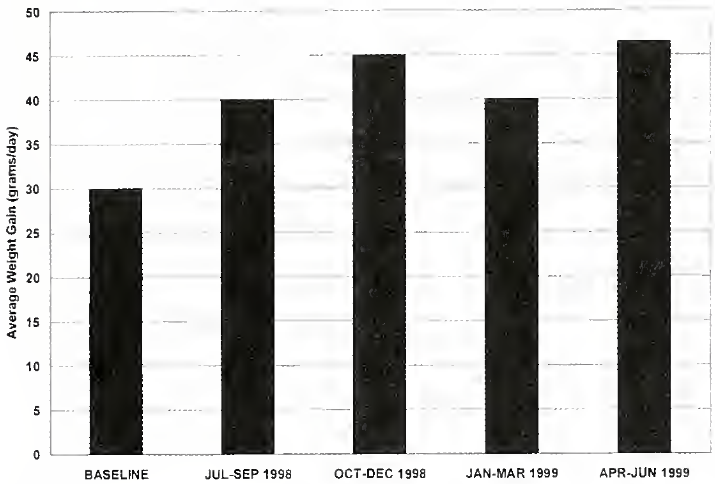

Figure 2. Neonatal Home Management Program critical indicator: average weight gain hospital vs. home (grams/day)

It is because of your visits that M has, to use your words, "blossomed from a seedling into a lovely flower." Please know how grateful I am and that each time I hold and comfort my daughter for the rest of her life, I will remember and honor you.

Other indicators of positive outcomes include diminished emergency department visits and unscheduled calls on the pediatrician. The "on call" availability of neonatal home management nurses gives families access to advice at any time. During the first year, three emergency visits were avoided because the family got appropriate information and support from a Neonatal Home Management Nurse. Our pediatricians believe that there are fewer unscheduled office visits during the infant's first month at home.

Financial Outcomes

The Neonatal Home Management Program has allowed us to discharge infants weighing one pound less than those discharged before the program was begun. Infants hospitalized at Carolinas Medical Center gain approximately one pound every 16 days (Figure 2). This means that it would take more than two weeks for hospitalized infants to achieve the weight formerly considered suitable for discharge. Because an average daily charge for neonates is $1665.00, we calculate that by saving two weeks in the hospital, the program has saved over two million dollars in charges.

Conclusion

Present day financial constraints mean that hospitals must be innovative in providing high quality but cost-effective care. The Neonatal Home Management Program has allowed low birthweight infants to do well at home after shorter hospital stays. The families of these neonates have enthusiastically supported the program and, in their own way, have thrived under the guidance of the neonatal home management nurses. The positive outcomes for the neonates and the high degree of parent and family satisfaction are testaments to the accomplishment of our mission: to provide a high quality of care to our patients and our community, and to be mindful of costs. Without a doubt, the success of the neonatal home management team - nurses, neonatologists, and families - proves the wisdom of the old adage: there really is "no place like home!"

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Periconceptional Folic Acid to Prevent Neural Tube Defects

Mohammad Masud Iqbal, MD, MPH, MSPH, DTM

Neural tube defects (NTDs) are among the most common and serious of birth defects, affecting about 4000 pregnancies each year in the United States. US women who have had one pregnancy giving rise to an infant or fetus with an NTD have a 2-3% risk of NTD in subsequent pregnancies.[1]

Thirty years ago, it was suggested that the incidence of serious fetal malformations could be reduced if mothers used vitamins during pregnancy. Subsequent research revealed that folic acid, a B vitamin, plays a crucial role during development of the central nervous system early in gestation, often before pregnancy is even confirmed. In a significant number of instances, an inadequate supply of folate leads to failed closure and abnormal differentiation of the embryonic neural tube. The result is an NTD. A number of randomized and non-randomized studies have confirmed that adequate folate intake just before and after conception lowers the risk of NTDs.

Suspicion that folic acid might prevent NTDs was raised in 1964, and studies[2] of vitamin supplementation at the time of conception were tried in women who had already had a child with an NTD. In the first such study, daily supplementation with 0.36 mg of folic acid reduced the risk of NTD recurrence by a factor of seven, and a second study also showed a significantly lower risk in the supplemented group. Six of seven other studies[2] confirmed the lower risk. To avoid bias, in 1983, the British. Medical Research Council (MRC) organized a large, international, multi-center, double blind, randomized trial. They recruited women who had had a baby with an NTD, who were planning another pregnancy, were not already taking vitamin supplements, and did not suffer from epilepsy. After 1,195 pregnancies, there were 27 with NTDs, 6 in the folic acid group and 21 in control groups.[2] Sequential analysis showed 72% protective effect. Another randomized, double-blind, controlled trial of 4,753 Hungarian women showed that up to 50% of first occurrences of NTDs could be prevented by giving periconceptual multivitamins containing 0.8 mg of folic acid.[2]

Within weeks of publication of the British MRC study, the US Centers for Disease Control issued guidelines for women in whom a prior pregnancy resulted in an NTD. In September 1992, the US Public Health Service (USPHS) recommended that all women of child-bearing age, who are capable of becoming pregnant, take 0.4 mg of folic acid daily to reduce the risk of an NTD-affected pregnancy. USPHS also recommended that women take 4.0 mg (4000 micrograms) of folic acid every day for 1-3 months before planned conception and continue through the first months of pregnancy.[3] Three cents' worth of folic acid per day could reduce the number of cases of NTD in the U.S. by 70% (an important public health opportunity)![4]

There is only limited information about adverse effects from folic acid supplementation. Daily doses of 1-5 mg of folic acid can mask the hematological manifestations of vitamin B_{12} deficiency, possibly leading to permanent neurological consequences by delaying diagnosis and treatment. Therefore, folate consumption should be kept to less than 1 mg/day, except under physician supervision.[5]

Fortification of food is a "passive" way to increase intake of folic acid during the critical period of embryonic development. In February 1996, the USPHS announced mandatory folic acid fortification of enriched cereal grain products (flour, bread, pasta, rice and corn meal) to take place as of January 1, 1998. Fortification is expected to increase the daily intake of folic acid in women of reproductive age by about 100 mcg/day. Fortification at this level should prevent about 1000 cases of spina bifida and anencephaly each year.[6]

The recommended intake of folate in the periconceptional period can therefore be achieved by advising women who could become pregnant to supplement a healthy, folate-rich diet with a daily vitamin pill, or by fortifying foods with folic acid, or by combining these measures.

Physicians and other health professionals need to be aware of and to educate the public about the value of folic acid

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supplementation in preventing NTDs. Meanwhile, we need to continue surveillance programs to monitor the prevalence of NTDs in fetuses and newborns, and we need basic and clinical research into the mechanisms by which folic acid prevents NTDs.

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10 Questions—and 10 Answers—About the Role of "Statin" Therapy after Coronary Artery Bypass Grafting

Charles S. Roberts, MD, Kimberly D. Donovan, MS, ANP

Over the past 30 years, coronary artery bypass grafting (CABG) has become commonplace. About a million CABG procedures are now done every year in the United States. This means that several million individuals are eligible for secondary preventive measures, the goal being to avoid future cardiovascular events. In this article we answer ten questions pertinent to the use of 3-hydroxy-3-methylglurarylcoenzyme A inhibitors ("statin" therapy) to lower cholesterol synthesis and thereby improve blood lipids after CABG.

(1) What percentage of CABG patients have had a cardiovascular event? Nearly all. The CABG database of the Society of Thoracic Surgeons indicates that at the time of CABG surgery, 59% of patients have unstable angina pectoris, 47% have had a myocardial infarction, 12% have congestive heart failure, and 2% are in cardiogenic shock.[1] Atherosclerosis is clinically demonstrable in cerebral or peripheral vessels in 20% of CABG patients.[1]

(2) How extensive is the coronary atherosclerosis in CABG patients? Based on angiograms (which generally underestimate the extent of coronary atherosclerosis compared to autopsy studies[2]), most patients have "three-vessel disease"; the database of the Society of Thoracic Surgeons indicates that 73% have atherosclerotic narrowing of all three major epicardial coronary arteries, 21% have narrowing of two, and 6% have narrowing of one.[1] About 20% have significant narrowing of the left main coronary artery.[1] It seems clear that CABG patients carry a heavy burden of atherosclerosis.

(3) What drugs are usually prescribed after CABG? Shortly after surgery, most CABG patients need analgesics and diuretics. Over the long term, most are told to take an aspirin tablet every day. If they have had a myocardial infarction in the past, a beta-adrenergic blocking drug is usually prescribed. But it is not likely that a CABG patient will get a prescription for a statin drug. It is also not likely that patients will have taken a statin before surgery. Cardiac surgeons tend to continue preoperative medications after surgery, except for nitrates, which are routinely discontinued.

(4) Has CABG been compared to statin therapy in a clinical trial? No. Randomized trials comparing CABG to medical therapy were carried out before statin drugs were available. A 1992 meta-analysis by Yusuf and associates concluded that CABG improved 5-year survival by an average of 39% compared to medical therapy.[3] But only 10% of the CABG patients in the trials had an internal mammary arterial conduit, which is standard today. Thus, neither the surgical nor the medical treatments used in the randomized studies of coronary artery disease is comparable to today's approaches, when internal mammary arteries are used routinely and statin drugs are part of standard medical therapy.

(5) Does statin therapy improve conduit patency after CABG? Yes. The Post Coronary Artery Bypass Graft Trial[4] studied whether aggressively lowering low-density lipoprotein (LDL) cholesterol levels affected saphenous vein conduits. Reducing the LDL-cholesterol level to below 100 mg/dL significantly reduced angiographically evident atherosclerosis in saphenous vein conduits, which are already less disposed to atherosclerosis than arterial conduits.

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(6) Does statin therapy reduce the need for a second CABG? Probably. The Post Coronary Artery Bypass Graft Trial found that those whose LDL-cholesterol levels were aggressively lowered to below 100 mg/dL had a 29% lower rate of revascularization over four years compared to those receiving moderate treatment (p=0.03).[4] Analysis of a subset of 1091 CABG patients in the CARE study found that revascularization was 14% less likely in patients treated with pravastatin compared to placebo, but the difference was not statistically significant.[5]

(7) Why is it important to avoid a second CABG? The early mortality rate for a second CABG is about 5-10%, roughly twice that for a first operation.[6,7] Risks unique to the second CABG include catastrophic hemorrhage during sternal reopening; injury to patent conduits (particularly the left internal mammary artery); embolism during manipulation of old conduits; greater requirement for an intra-aortic balloon pump; greater incidence of low cardiac output syndrome; greater frequency of perioperative myocardial infarction; and greater likelihood of continuing angina pectoris.[8-10]

(8) Does statin therapy reduce the frequency of cardiovascular events after CABG? Yes. Two of the three major secondary prevention trials[11-13] included patients who had already undergone CABG. In the CARE study,[11] 1091 patients (about 27%) had prior CABG; separate examination of the results in these patients showed a 33% risk reduction in coronary death or nonfatal myocardial infarction in those receiving pravastatin compared to placebo.[5] Similarly, 27% of subjects in the LIPID study had had CABG; the incidence of adverse cardiovascular events in this subpopulation was consistently lower among patients receiving pravastatin, but these patients have not been examined as a separate group.[12]

(9) Does statin therapy prolong survival after CABG? Yes. In the CARE study, CABG patients given pravastatin had a 38% survival benefit at 5 years and 44% fewer deaths from coronary artery disease compared to those given placebo.[5] The LIPID study showed a 24% relative reduction in risk of death from coronary artery disease, and overall mortality was reduced by 22% in the pravastatin group.[12] The third secondary prevention trial (the 4S study[13]) excluded patients who had already had CABG, but who did have angina pectoris or myocardial infarction, just as do most CABG patients. The group given simvastatin had a survival benefit at 5.4 years of 30% compared to the placebo group.[13]

(10) What should we routinely do after CABG? Recognizing that all therapy must be individualized, we have some general recommendations. With few exceptions, a statin drug and an aspirin should be prescribed after CABG.[14] Patients with systemic hypertension or abnormal left ventricular ejection fraction should be given an angiotensin converting enzyme inhibitor.[15] Patients who have already had a myocardial infarction should be on a beta blocker, unless there is overt congestive heart failure or bradycardia.[16] We recommend follow-up of CABG patients three and six months after surgery to adjust the statin dose (to achieve an LDL cholesterol level under 100 mg/dL[15]) and to modify other cardiovascular risk factors such as smoking and obesity.

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Hypertension and Associated Risk Factors in Young African-American Women Attending a Community Health and Wellness Center

Carla Yunis, MD, MPH, Sharon A Jackson, PhD, Linda Carter, Carolyn Marcus, PA

African Americans have a higher prevalence of hypertension than other ethnic groups. African Americans generally have earlier onset of disease and more target organ damage, especially end-stage renal disease and stroke.[1] African-American women experience more—and earlier—morbidity from hypertension than do Hispanic or white women, a difference that persists through the 6th decade of life.[1] Data from the Coronary Artery Risk Development in Young Adults (CARDIA) study suggest that even normotensive African-American women aged 18-34 have higher blood pressure levels than white women of similar age and education.[2]

A high prevalence of obesity[2] and other dietary,[3,4] psychosocial,[5] and genetic factors may partially explain racial differences in the prevalence of hypertension. Lower socioeconomic status (SES) tends to increase the prevalence of hypertension among minorities. A recent analysis[6] confirmed an inverse relationship between SES and cardiovascular disease (CVD) risk factors, and showed that the SES disadvantage is most pronounced in ethnic minorities. African-American women in particular had worse CVD risk factor profiles, particularly in regard to blood pressure, compared to other women of similar SES.[6]

The greater prevalence of high blood pressure in African-American women, especially women of lower SES, makes it is imperative that we better understand the factors leading to early onset hypertension so that effective prevention strategies can be developed. In this paper we examine the prevalence of high blood pressure and risk factors for hypertension in low-income, young, urban, African-American women attending a community health clinic.

Methods

Sampling frame: We studied women attending the Today's Woman Health and Wellness Center (TWHWC), a comprehensive resource center for women and children located in Forsyth County, NC. TWHWC serves women of childbearing age (10-44 years) who live in the Kimberly Park/ Boston Thurmond neighborhood of Forsyth County. This neighborhood has approximately 7600 residents, 97% of whom are African-American. About 30% of community residents own their own homes (most valued at less than $50,000), and 40% live at or below the poverty level. Almost 50% of children under the age of 5 years live below the poverty level. About 65% of residents are high school graduates and 14% are also college graduates, but approximately 75% of families had a total family income of less than $25,000 in 1995. Only 21% of residents had health insurance (usually Medicaid). Since 1995, the Center has enrolled 956 of the approximately 3000 eligible women from the neighborhood; 99% are African-American and 26% are teenagers.

Study design: Data were collected by retrospective medical record abstraction. A systematic sample (every tenth chart) of the clinical records of all non-pregnant women was selected

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Table 1: Demographic and anthropometric characteristics of 90 TWHWC members.

Characteristic	Mean ± SD
Age (years)	30.4 ± 11.6
Education (years)	11.6 ± 1.7
Systolic blood pressure (mm Hg)	122.2 ± 24.8
Diastolic blood pressure (mm Hg)	74.1 ± 17.9
Body mass index (kg/m^2)	29.1 ± 7.7
Positive family history of hypertension(%)	66.7
Positive family history of diabetes (%)	30.0
Hormone contraceptive use (%)	22.2
Proportion of unmarried members (%)	72.2
Insurance	
Uninsured (%)	34.4
Medicaid (%)	48.9
Currently smoking cigarettes (%)	50.0
Unemployed (%)	45.8

and data were abstracted by study investigators using a standardized data collection form to record demographic, social, anthropometric, and medical information.

Measurements: Specific items abstracted from the records included date of most recent clinical evaluation; age (in years); marital status (married, widowed, divorced, separated, never married); insurance status (insured or not); employment status (employed or not); education (less than high school, high school graduate/GED, some college, college graduate); medical history of high blood pressure; heart disease, or diabetes mellitus; family history of high blood pressure, heart disease, or diabetes mellitus; cigarette smoking (current smoker or not); alcohol intake; height (in inches); weight (in pounds); blood pressure (mmHg); and method of contraception (oral contraceptives, Norplant, Depo-Provera, condoms, none).

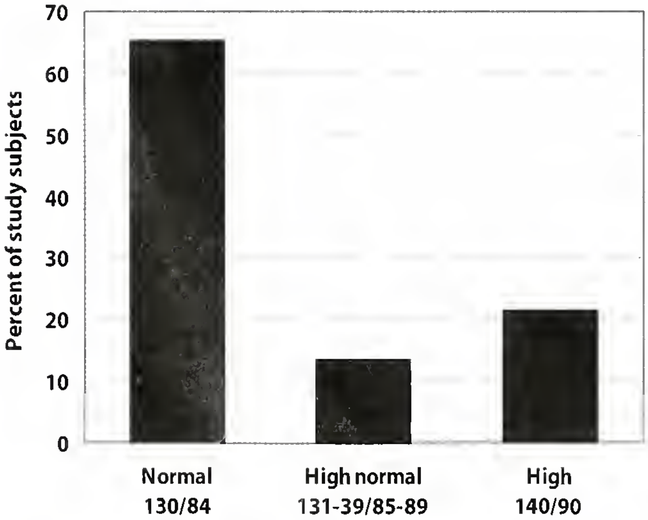

Figure 1. Blood pressure distribution according to JNC-VI criteria[7] for TWHWC members.

Analysis: Univariate descriptive statistics (mean, standard deviation, response frequency) were calculated for all variables. The Chi-square and student t-tests were used to determine the significance of differences between those with and without elevated systolic blood pressure. Multiple linear regression models were used to examine whether demographic, social, anthropometric or medical indicators were associated with systolic blood pressure. All analyses were made with SAS statistical computing software (SAS/UNIX System, Release 6.12. Cary, NC: SAS Institute, Inc., 1995).

Results

The final sample consisted of 90 members of TWHWC. Demographic characteristics of the sample are shown in Table 1. TWHWC members were young (mean age 30 years; median 25 years) and predominantly unmarried. Approximately 33% had not completed high school. The distribution of cardiovascular risk factors including socio-economic indicators showed an adverse profile. Half of the women were current smokers, a third were obese, and two-thirds had a positive family history of hypertension. Approximately half of the sample was covered by Medicaid and one-third was uninsured. The rate of unemployment was high.

Hypertension prevalence is shown in Figure 1. Based on the most recent blood pressure measurement, roughly 22% of these young women were hypertensive according to JNC-VI criteria.[7] Another 13% had high-normal blood pressure levels. Blood pressure was higher with increasing age ($r=0.29$, $p <0.01$) and body mass index (BMI) ($r=0.27$, $p <0.03$). Thus, hypertensive women were older (36 vs. 28 years, $p < 0.02$) than their normotensive counterparts, but BMI differences between the groups were not statistically significant. When we examined the age-adjusted distribution of BMI by blood pressure status (Figure 2), there was a positive association between BMI and blood pressure levels. In multivariate analysis, BMI was the only independent predictor of systolic blood pressure ($p <0.05$).

Discussion

Several studies have shown that African-Americans are disproportionately affected by health inequalities. Gillum[8] reported that age-adjusted all-cause and heart disease mortality rates were higher for African-American women than

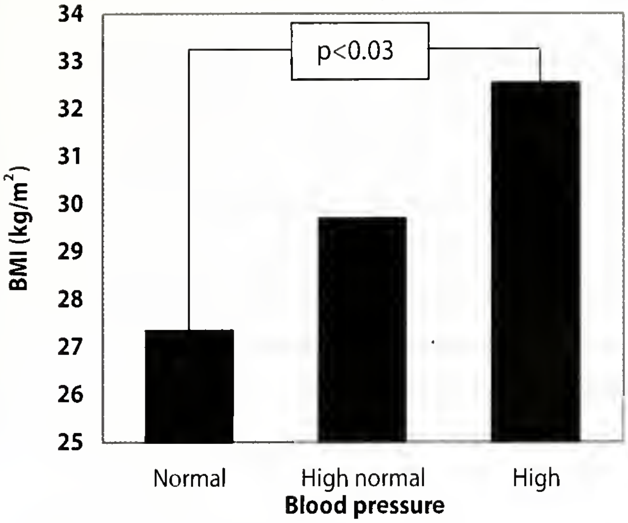

Figure 2: Mean age-adjusted BMI by blood pressure status.

for US whites or women in other industrialized (Canada, France, Switzerland, Japan, Finland) and non-industrialized (former Czechoslovakia) countries. African-American women also experience more hypertension-related target organ damage, such as left ventricular hypertrophy.[2]

Our results confirm the early onset of elevated blood pressure among African-American women and underscore the importance of screening for hypertension in this population. According to the latest National Health and Nutrition Epidemiological Survey (NHANES), the national prevalence of hypertension and high normal blood pressure in African-American women aged 18-49 years is 8% and 7% respectively.[1] Our sample was similar in age, but the prevalences of high-normal and distinctly high blood pressure were approximately twice the NHANES estimates. This difference in prevalence may reflect, in part, the increased proportion of lower SES females in our sample. The TWHWC population is predominantly lower income while the NHANES sample is likely more heterogenous with respect to SES.

Obesity, highly prevalent in minority populations, is an important risk factor for hypertension. National figures suggest that the prevalence of obesity in African-American women is twice that of white women.[3] Approximately 30 % of the women in our sample were obese (BMI $^{3}30$ kg/m^2) by current guidelines.[10] The relationship between obesity and blood pressure levels is illustrated by our finding of a stepwise increase in the prevalence of obesity with increasing blood pressure (lower BMI in normotensive women, and higher in those classified as hypertensive). Reducing obesity would have a significant impact on the risk of hypertension and might decrease the need for antihypertensive medications in women already diagnosed as hypertensive.

The state of North Carolina's Heart Disease and Stroke Prevention Task Force recently released its plan to prevent heart disease and stroke for the years 1999-2003.[11] Specific target areas include physical inactivity, inadequate nutrition, tobacco use, high blood pressure, elevated cholesterol, obesity and diabetes. Unfortunately, the strategies outlined in the task force's recommendations may not reach groups like the TWHWC membership, because the action plan relies on consumer choices, implies access to medical care and leisure facilities, or relies on employer-based programs.

Our study findings suggest that we have a long way to go in getting prevention messages to populations like the TWHWC membership. The high prevalence of hypertension found in our study supports the need for targeted, culturally sensitive initiatives to screen and detect high blood pressure, and to treat and prevent obesity. For African-American women of lower SES, employer-based strategies and programs designed to increase use of exercise or other specialized facilities must be augmented with strategies designed to incorporate education, lifestyle and behavior modifications into their daily tasks and sociocultural milieu.

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"Fixing" Medical Malpractice

One Doctor's Perspective of a Non-System in Need of National Standardization

S. John Guha, MD

Medical errors, including malpractice committed by doctors, are rampant in this country, and I freely acknowledge this.[1] This makes me a heretic. But I don't think that there is a doctor alive—even those from the best medical schools—who hasn't made a mistake at least once in his or her career. I graduated from Boston University School of Medicine in 1986, interned at Harvard's Deaconess Hospital, and in 1991, after a stint in the US Air Force Medical Corps (the only time in my career that I didn't have to worry about being sued!), became a full-time practicing emergency physician. It's a "high-risk" specialty because of the urgent character of the illnesses and injuries treated, the usual absence of a pre-existing relationship with the patient, and little or no knowledge of the patient's medical history. Because of my high-risk emergency practice, I have a healthy respect for patients (and their attorneys). Like many of my colleagues, I am appropriately concerned about risk management and medico-legal liability.

In the late 1970s and early 1980s, the United States experienced a tremendous rise in monetary awards for medical malpractice ("between 1975 and 1985 the average medical malpractice jury award . . . increased from $220,108 to $1,017,716"[2]). Because of these increasing awards and the general perception of increased liability risk, medical professionals and insurers have been concerned about what constitutes adequate coverage for the risk and liability of medical practice. Despite these concerns, I think that doctors should learn to testify against (as well as for) other doctors. How can this be? Let me explain.

In response to the perceived crisis in medical malpractice, in the late 1980s and 1990s many states passed legislation to reform medical malpractice law. This "tort reform" legislation either limited the size of awards for medical malpractice cases, or made it harder to sue doctors and healthcare institutions. In North Carolina, Rules 9J and 702 defined the requirements under which "medical experts" could testify in malpractice cases, and they required plaintiff's attorneys to have a medical expert review the case medical records before even filing a suit.[3] This means that plaintiff's attorneys must find a doctor willing to testify against another doctor (the defendant) before a malpractice suit can even be filed. This legislation was meant to lessen "nuisance malpractice claims" - claims with little to no factual basis, filed in the hopes of getting a settlement that would " make the problem go away quickly and economically." Nuisance suits are in fact sometimes settled for $30,000 to avoid spending $130,000 in legal fees. Many of the "expert witnesses" in these cases are "hired guns," willing to testify to almost anything for a high enough fee. Before tort reform, these "experts" were sometimes more professional witnesses than practicing doctors.

Rules 9J and 702 improved matters somewhat, but there are no federal or state operating procedures to standardize the process of expert medical case review and analysis in potential malpractice cases. Until we have standards for case review and analysis (CRA) by doctors, the problem of "hired guns" will not be resolved. As a matter of fact, irresponsible testimony is so pervasive that the American Medical Association has become involved, deeming service as a medical expert witness a part of "the practice of medicine" and recommending that such testimony should be subject to peer review by other doctors. The AMA went on to say that doctors who give "fraudulent testimony" should be held accountable and subject to punishment by state medical societies or Boards of Medicine.[4] I think that this was a step in the right direction; but I don't believe that the AMA went

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far enough to improve the quality of doctor CRA or to substantially reduce "hired gun" testimony. Before we can understand what needs to change in the way medical malpractice is currently handled, let's review what is wrong with the current "non-system."

The Current Medical Malpractice "Non-system"

Medical malpractice generally works as follows: a future plaintiff (a dissatisfied and/or injured patient or family member) seeks the advice of an attorney. If the claim seems plausible, the attorney obtains the pertinent medical records. In North Carolina, if the attorney decides the evidence suggests malpractice, a doctor is asked to review the medical records and offer an "expert medical opinion." If the doctor agrees that malpractice has occurred, the plaintiff's attorney then files a formal suit, and notifies the defendants (doctors or healthcare institutions or both), who, in turn, notify their malpractice insurance company(s).

The insurance company then asks its own expert doctors to view the medical records, or engages a defense attorney to have this done. The opinion of these medical experts often determines whether the case is settled or defended. If the expert agrees that malpractice has occurred, the defense attorney and malpractice insurance company (which ultimately is responsible for paying the legal fees of the defense) may offer to settle the case rapidly by offering monetary damage. If the defendants have no "right to consent" clause in their malpractice insurance policy, the settlement may be made without the consent of the defendants.

On the other hand, if the defense's expert consultants feel that there was no malpractice, then the insurance company will weigh the cost of defending the case versus settling it. If the costs of defending are likely to be less than the costs of settling, there then begins a long discovery phase, in which both sides gather information about the other side's experts through interrogatories, affidavits and depositions. The defendant doctor usually finds this to be slow and painful torture. It disrupts professional and personal life, and a sort of low-level, smoldering, reactive depression may settle in. Independently of any medical findings, discovery may convince the defense to settle, especially if the plaintiff's experts are strong and the defendant physician is not felt to be "jury-savvy"—that is, not likely to give a good impression in front of a lay jury.

Alternative dispute resolution methods such as arbitration or mediation are rarely used in medical malpractice cases. This is unfortunate because these are both faster and less costly than conventional litigation.[5] A conventional malpractice court trial is not only an ordeal for the defendant doctor, but is also a glorified popularity contest of sorts, in which the side with the most "jury savvy" experts may win on impression if not substance.[6] And because of the "popularity contest" aspect, justice does not always prevail. A convincing "hired gun" expert for the plaintiff may subtly distort complex medical details or editorialize in front of a suggestible lay jury. Irresponsible—even fraudulent testimony—is extremely hard to identify or punish because of the esoteric nature of much medical testimony and the fact that no agency or institution is legally responsible for monitoring doctors' expert testimony. This means that defendants who cannot present themselves favorably to the jury may lose the case on impressions alone.

The other side of the malpractice coin may be just as unfair. A defendant doctor who has actually committed malpractice may be acquitted because of reputation or jury tactics that are superior to those of the plaintiff's experts. Strong medical experts testifying for the defense may intimidate the plaintiff's experts. Indeed, it is often easier to find experts who will testify for the defense than for the plaintiff, even when *bona fide* malpractice has occurred (Elrod JA. Unpublished data, November, 1999). I believe it is tragic when a patient who has suffered malpractice does not get fair compensation or even a "day in court." I would like to see all doctors agree that inappropriately harmed patients should be compensated, and the health care system held accountable for incompetent doctors. The Institute of Medicine, a branch of the politically influential National Academy of Sciences, estimates that 44,000-98,000 patients are killed each year by medical errors, although most of these deaths are not due to physician negligence alone.[1] The report had significant media coverage and may lead to Congressional action.[7] Certainly it is the duty of the legal system to enforce all social contracts, including the contract between a patient and a doctor (or a patient and a hospital). Neither doctors nor hospitals like to admit it, but, as the Institute of Medicine points out so vividly, medical errors occur on a daily basis. In fact, the Institute of Medicine says further that most medical errors (including malpractice errors) are not adequately reported or tracked. One possible reason for underreporting of medical error is that—although all doctors know that at some point in their harried, over-worked careers they *will make a mistake*—doctors view the current medical malpractice system as heavy-handed and unfairly punitive. Some even view their day-to-day clinical practice as requiring them to cross a professional minefield where one misstep could spell the end of a career.

If the defense decides not to settle, the case proceeds to court trial, in which a jury of peers decides guilt or innocence and then the amount of monetary damages to be awarded. Many doctors feel that a "jury of peers" should consist not of laypersons but of other doctors, especially as malpractice cases often involve complex medical details that a layperson might find difficult to understand. In some emotionally argued cases, lay juries have awarded huge sums for "pain and suffering" even in the absence of obvious malpractice.

Statistically, only about 10-15% of malpractice cases actually go to trial; the remainder are either dropped or settled before trial. Of the cases that do go to trial, the defense wins about 80% of the time. This means that plaintiffs succeed at trial less than 3% of the time.[6] Still, if the defense loses a malpractice trial or settles a malpractice claim, regardless of the reason or the amount of the award or settlement, the defendant doctor must (by federal law) be reported to the National Practitioner Data Bank (NPDB), designed by Congress to track "incompetent" doctors nationally.[8] The irony is that some of the best doctors at the best medical centers in the country are the very ones likely to be sued and hence have files at the NPDB, because these doctors often care for the sickest patients with most dismal prognoses.[9]

The requirement to register with the NPDB means that if an insurance company settles for purely economic reasons, the defendant is still permanently labeled as an "incompetent" on file at the NPDB. This reporting requirement has made the NPDB a farce in my opinion and that of many doctors, malpractice carriers, and defense attorneys. It is one of many reasons that doctors feel that the system is stacked against them. Why, then, would I, practicing in a high-risk specialty and associated with a major academic medical center, advocate that doctors testify against other doctors (as well as for them)? Please read on.

A National Standard for Medical Malpractice Physician Experts

I believe that the medical malpractice system is "broken." I also believe that it can be "fixed." However, this will require consensus and teamwork by leaders of the medical and legal professions (or we will have rules imposed by state or national legislation). My suggested solution is to standardize, certify, and regulate expert medical CRA and testimony. Clinical medicine has long had "standards of care," but there are no national standards for medical malpractice CRA. The AMA says that analysis of potential malpractice cases by experts is part of the "practice of medicine"; I believe that standards should be established for malpractice testimony, as it is for other aspects of medical practice. Doctors who review and analyze the medical records of a patient who alleges malpractice would use these standards to guide their assessment of the chart from a medico-legal as well as a strictly medical perspective.

In their training, doctors participate in "peer review" or "mortality and morbidity" conferences, designed to let them learn from their mistakes and thereby ultimately to improve patient care. The reviews are based on the specifics of each case, within the framework of medical science and sound clinical judgment. As a result, there is now a "science" of peer review, developed over the last two decades, called "risk management" or "quality assurance," or "total quality improvement." Unfortunately, the true and proven standards and principles of peer review have not been applied to the malpractice arena. My suggested solution can be summarized by one simple phrase: standardization by certification.

Medical doctors often attend intense two-day courses, which attempt to bring our knowledge about various medical topics to a minimum level, regardless of our specialty. Two good examples of this are the ACLS [Advanced Cardiac Life Support] course offered by the American Heart Association and the ATLS [Advanced Trauma Life Support] course given by the American College of Surgeons. I teach in both, and I feel that their basic format could well be adapted to the medico-legal arena. What I propose is a sort of ACLS/ATLS type of course for doctors who want to function as medico-legal experts. A two-day course would teach participants about medical malpractice jurisprudence and how to assess a medical record responsibly for evidence of malpractice. If state legislatures, medical societies, boards of medicine, or the US Congress were to endorse or even mandate such a course as a prerequisite for serving as an expert case reviewer and witness, then most of the problems of medical malpractice would be solved in one fell swoop. We might call this course "AMLS," for "Advanced Medico-Legal Support."

An AMLS course would start by reviewing introductory and basic information, such as legal terminology and the "anatomy" of malpractice litigation. Instruction in the standards of malpractice CRA would follow. Attendees would refresh and use their pre-existing knowledge of the "science" of Peer Review/Mortality and Morbidity/Quality Assurance/Total Quality Management to learn how to deliver fair, legally sensitive, and medically justifiable opinions as to whether malpractice occurred or not. A nonadversarial, consultant role would be stressed, and alternative dispute resolution methods emphasized, still recognizing that expert witness must take a definite and unequivocal position in a case. Valid plaintiff's issues would be addressed. Instruction on principles of medical malpractice insurance and on the National Practitioner Data Bank would also be included.

Finally, doctors would learn how to conduct themselves properly as expert witnesses in a deposition or trial. It would not matter whether the consultant worked for the defense or plaintiff's attorneys or for the court, because in their broad-based role as medical analysts and nonadversarial expert witnesses they would adhere to clear guidelines delineated in the AMLS course. In the final analysis, justice is served only when a medical expert is neither overly lenient or forgiving towards the defense, nor overly aggressive on behalf of the plaintiff. It would be difficult to characterize medical experts who had taken an AMLS course as "hired guns." The course could be administered through medical, legal, or medico-legal associations such as the American Medical Association, American Bar Association, or the American College of Legal Medicine - just as ACLS is administered by the American

Heart Association and ATLS by the American College of Surgeons. Both attorneys and physicians would teach it.

As a physician interested in the whole process of malpractice testimony, and in conjunction with a leading heathcare legal firm in North Carolina, I have constructed an initial syllabus for such a course (Guha SJ, Hollowell E. *Advanced medico-legal support course outline,* available from Expert Medico-Legal Opinions. Guha Medical Services, P.A). I offer it as a starting point for discussion. Because of my interest in these matters, I have formed a medical corporation (Guha Medical Services, PA); our medico-legal division (Expert Medico-Legal Opinions or "EMLO" for short) will soon require that generalist physicians involved in our medico-legal CRAs take and pass this course. Our AMLS course will provide "EMLO-certification" to participants who pass written and oral examinations in CRA. EMLO is currently establishing a network of multi-specialty physicians to do CRAs. If and when funding becomes available, EMLO would offer its AMLS course to all interested medical doctors. I believe that if the principles of AMLS were implemented and readily available to doctors on a much wider basis, this would be a great step forward in "fixing" the problems with medical malpractice litigation.

Summary and Conclusions

Why do I, a practicing physician, believe that doctors should learn how to testify both for and against physicians in malpractice cases? The answer is simple: no one is better qualified to critique a physician than another responsible physician. True expert evaluation would be the best determinant of malpractice, regardless of whose medical experts were "flashiest" in front of the jury. But, if they are serious about this grave responsibility, doctors must shed any protectionist attitudes, they must shed the stigma of "going after one's own," and they must not shy away from the inconvenience of legal proceedings. They must take time from their busy schedules to become educated through AMLS, and they must become actively involved in medical malpractice jurisprudence. Only in this way can physicians truly improve medical malpractice, and help level the malpractice playing field so that all parties are fairly dealt with. In other words, doctors must take responsibility for medical malpractice and get involved with doing medicine's dirty laundry; otherwise, legal/legislative/governmental agencies and the courts will do it for us.

The AMLS course I propose would, if implemented on a large scale, restructure the very nature of medical malpractice in this country. It would teach physicians about the legal system, about medical malpractice Case Review and Analysis, and malpractice jurisprudence, about alternative resolution methods, about malpractice litigation, and about being a "good" medical expert witness. It would round out doctors' knowledge of peer review principles, medical malpractice insurance, and the workings of the National Practitioner Data Bank. It could help to minimize medical errors by teaching "bad" doctors to be "good," or at least more mindful and less careless—a sort of "legal vaccination" for medical practitioners. Finally, it could help bridge the tension-filled gap between two leading professions that should work together rather than at odds.

If leading medical and legal institutions such as the AMA and ABA were to administer organized, intense AMLS courses, malpractice proceedings would be fair to both plaintiffs and defendants. Incompetent physicians would be appropriately sanctioned and/or remediated, patients with justifiable claims would be heard and appropriately compensated, and the vast majority of doctors would be reassured about doing what they do best—practicing good medicine—without the constant threat of nuisance malpractice suits. I would like to see the leaders of professional medical and legal institutions, as well as private and governmental healthcare agencies, consider an Advanced Medico-Legal Support course as one way to help correct some of the flaws in how medical malpractice is currently handled. AMLS could not only help eliminate "hired gun" physicians, but could also help revolutionize the current "non-system" known as medical malpractice.

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Carolina Physician's Bookshelf

Edward C. Halperin, MD, Book Review Editor

Stoking the Fire: A Surgical Memoir of London

By Charles S. Roberts, MD

New York, NY: Futura Publishing Co., 1999

Reviewed by Richard A. Baecher, MSII, UNC-Chapel Hill

The author, a cardiothoracic surgeon at UNC-Chapel Hill, describes his experiences and impressions in a year-long fellowship at the Royal Brompton Hospital in London. Thoughtful and accessible, this book serves up a blend of sociomedical information and candid personal reflections. Many of Roberts' adjustments to life in England are described, often with colourful humour:

> *In London, I had to relearn several basics of daily life: how to telephone someone, where to wash clothes, what the money was worth, where to eat, how to cross streets. Lincoln once asked three people in the operating theater to say 'Birmingham' to compare accents for my benefit.*

"Lincoln" is the author's formidable mentor, Surgical Consultant Christopher Lincoln, FRCS. In addition to witty cultural commentary, the book places considerable emphasis on portraying Lincoln and the impressions he made on the author. The title itself comes from Lincoln's comparison of surgical training to shoveling coal into a furnace, tending it for a sufficient time, and growing accustomed to the heat. Poignant anecdotes of Mr. Lincoln's professional persona appear throughout.

> *Lincoln's approach was refreshingly to the point. I was told one story about Lincoln seeing an elderly woman for a heart operation the next day. She told him that she was very anxious, that tomorrow was one of the most important days of her life. Lincoln calmly responded that he was not anxious and that tomorrow was not a particularly important day of his. After Lincoln left the room, she told his assistant that she found his comment strangely comforting.*

Lincoln was born in England and graduated from medical school in Dublin. His training includes UK' s Brompton Hospital, National Heart Hospital, London Chest Hospital, The Hospital for Sick Children on Great Ormond Street, and a research year as a Fulbright Scholar at Massachusetts General Hospital. He has served for over 23 years as Surgical Consultant at the Brompton and has authored or co-authored over 180 medical articles. Lincoln's fortitude is well evidenced by his eclectic daily discipline:

> *He never ate during the day. He drank green tea from China. You could trace his movements during the day by following his teacups in the hospital... the first thing he did on arriving home nightly was take two aspirin and drink two glasses of champagne... Though he ate only once daily, Lincoln took great pleasure in food...*

In addition to depicting his mentor, Roberts does a good job of describing some differences in hospital care he observed while overseas. He was impressed overall with the British style:

> *The nurses kept each patient nearly covered with clean white sheets and blue blankets. This attention to cleanliness and privacy was striking to me in the first few days of work... The adult ICU nurses stayed at the bedside of their patient[s] the entire shift... I rarely saw more than one nurse at the nurses' station, sometimes no one. This was a major difference in ICU nursing care in the UK and USA. In the States, nurses often based themselves at the nurses' station and went to the patient's bedside as needed... [At the RBH] Food was eaten in the dining room or behind the closed doors of the break room, which was not even on the ward. This also contrasted sharply with my observation of ICUs in the States, where food was often eaten in view of patients and their families.*

In one account, we are also given a brief glimpse of the publicity surrounding Lady Diana and her frequent visits to patients at the RBH. Roberts' next-door neighbor on Neville Street, surgeon Haznat Khan, evidently had a relationship with her that earned him celebrity status and frequent tabloid coverage.

Along with material particular to England, we are given personal anecdotes about Roberts and his fiancée, with brief yet flavorful descriptions of visits to Prague, Dublin, and Hamburg with multiple contrasts to London's architecture, literature, cuisine, and gestalt. "Stoking the Fire" is a practical preview for an American anticipating medical work in London, a plethora of prominent names and history for the cardiothoracic bibliophile, a charming compilation of theatrical and literary commentary , and a pleasant read to the medical neophyte. It should warm the bookshelves of many.

CME Calendar

July 9-12

Practice Update in Medicine for the Primary Care Physician

Place: The Mills House Hotel, Charleston, SC
Credit: Up to 13.5 hours, Category 1, AMA, AAFP
Fees: $300 Baptist Med. Healthcare Corp physicians & non-BMHCC nonphysicians; $350 non-BMHCC physicians; $275 BMHCC nonphysicians;
Info: Baptist College of Health Sciences, Memphis, TN: 901/227-4580 or 888/857-8344

July 13-14

Bridging Research and Care: World Alzheimer Congress 2000

Place: Washington Hilton and Towers, Washington, DC
Credit: Up to 11.75 hours, Category 1, AMA (pending)
Fees: $200
Info: 312/335-5813; *email*: alzheimer2000@alz.org; *website*: www.alzheimer2000.org

July 20-22

28th Annual Seminar for Physicians on Breastfeeding

Place: Hilton Head Island, SC
Credit: 16 hours, Category 1, AMA
Fees: Before June 5: $475; medical associates $400; $375 spouse/guest; after June 5: $550/$475/$450
Info: La Leche League Int'l., PO Box 4079, Schaumburg, IL 60168-4079; 847/519-7730 x218; *email*: ckolar@llli.org

July 30-August 4

Adult and Pediatric Allergy and Asthma Update

Place: Bald Head Island, NC
Credit: Up to 23 hours, Category 1, AMA
Fees: $325
Info: *Registration*: 877/227-8199; *content*: 336/373-0936; *accommodations*: 800/432-RENT or 910/457-7506, ask for Judy Treadway (refer to Group #41922)

(1) September 22-24; (2) December 10-12

Emergency Ultrasound Course

Place: (1) Charlotte, NC; (2) Columbia, SC
Credit: Up to 21 hours, Category 1, AMA; 21 hours, Category 1, ACEP
Fees: $700 physicians; $650 ACEP; $600 SCCEP; $500 residents and PAs; $450 students
Info: South Carolina College of Emergency Medicine; Thomas D. Cook, MD, 145 Sassafras Tr., Lexington, SC; *email*: huntpat@sc.rr.com; *website*: www.emergencyultrasound.com

October 14-15

27th Postgraduate Course: The Alexander Spock Symposium: Practical Management of Common Problems in Ambulatory Pediatric Patients

Place: Searle Center, Duke University Medical Center, Durham
Credit: TBA
Fees: $150 ($100 Saturday; $50 Sunday) physicians; $9 allied health professionals; no charge for emeritus or in training
Info: J. Marc Majure, MD 919/684-2289

October 21

2000 Coastal Medical Retreat

Place: Holiday Inn SunSpree Resort, Wrightsville Beach
Credit: 6.5 hours, Category 1, AMA
Fees: $150 physicians; $35 admission to dinner dance for spouses, guests, nonregistered physicians
Info: Sponsored by UNC School of Medicine. October 20: Golf, tennis, dinner & dance on October 20. Call Bonnie Brown, New Hanover-Pender Co. Medical Society: 910/790-5800. Email: nhpcmeds@wilmington.net.

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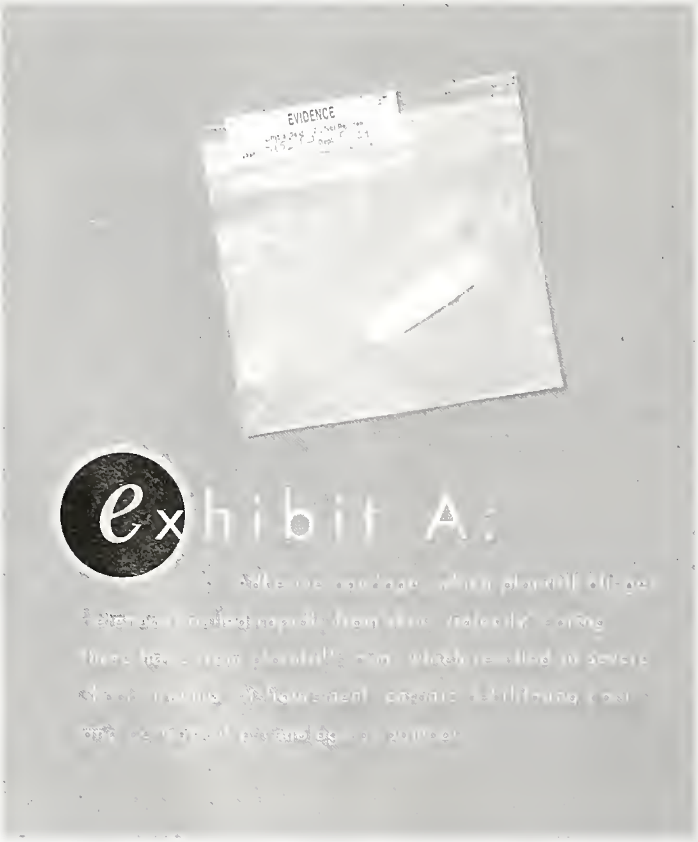
> *–Harvey Cushing, 1935*



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The *Journal* will consider for publication articles relating to and illuminating medical science, practice, and history; editorials and opinion pieces; letters; personal accounts; poetry and whimsical musings; and photographs and drawings. Papers that relate to the present, past, or future practice of the health professions in North Carolina are especially pertinent, but manuscripts reflecting other perspectives or topics are welcomed. Prospective authors should feel free to discuss potential articles with the editors.

Manuscript Preparation

Prepare papers according to the "Uniform Requirements for Manuscripts Submitted to Biomedical Journals" (N Engl J Med 1991;324:424-8) with the following exceptions: 1) no abstract is needed; 2) no running title is needed; and 3) report measurements in metric units; use of the International System of Units (SI) is optional.

Submit a cover letter and a 3 1/2-inch computer disk that contains the text written in MS DOS- or Macintosh-compatible format. *Also enclose three hard copies of the text for review purposes.* Double space text with one-inch margins. *Please do not "format" the text* (e.g. no variations in type size, no bold face, no italics, no embedded endnotes).

Submit photographic illustrations, in duplicate, as high-quality color 35mm slides or 5-by-7 or 8-by-10-inch glossy prints, or as black-and-white glossy prints (5-by-7 or 8-by-10-inch). Label all illustrations with author's name, number them sequentially according to their position in the text, and indicate the orientation of the images, if necessary. *Do not write directly on the backs of prints.* This can damage them. If figures require printing in four-color process, we may ask the author to pay printing fees or a portion thereof.

Submit tables, charts, and graphs as hard copy *and* include copies on disk, in their original format *and translated as TIFF, PICT, or EPS documents.* Type all figure legends separately. Type and double-space all tables, one to a single sheet of paper. Tables must have titles and consecutive Arabic numbers.

Keep references to a minimum (preferably no more than 15), retaining those that document important points. The "Uniform Requirements" cited above contain reference format. We customarily list the first three authors for "et al"-type references. Authors are responsible for the accuracy and pertinence of all citations.

Avoid abbreviations entirely if possible; keep them to a minimum if not. When used, completely define abbreviations at the first point of usage in the text.

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A medically qualified editor reads all manuscripts and, in most instances, sends them out for further review by one or more other members of the North Carolina Medical Society. *Authors' cover letters must include a line that states that their submitted manuscripts are not under consideration for publication elsewhere. It is not the Journal's policy to reprint previously published articles.* Decisions to publish or not are made by the editors, advised by the peer reviewers.

We encourage a relatively informal writing style since we believe this improves communication. Imagine yourself talking with your unseen audience—as long as this doesn't lead you to scientific or linguistic inaccuracy. Be brief, clear, simple, and precise.

We edit accepted manuscripts for clarity, style, and conciseness. Except for letters, authors receive a copy of the edited manuscript for their review and approval before publication. Manuscripts not accepted will not be returned.

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Speaking of Medicine

"Talking with Patients"

Ever since I told a crowded room I had a Bavarian cyst and not only did no one laugh, but two others had the same thing, I've been convinced that doctor and patient do not speak the same language. They speak Latin. We speak Reader's Digest.

—Erma Bombeck

The call for the "old-time physician" is not a call for a wise old man with a little black bag and a few harmless (and useless) nostrums, but a yearning for communication in a common language.

—Jerome Lowenstein

In explaining a disease, when the case is thoroughly understood, one should announce the diagnosis like unfurling a banner from the rooftop of your house, or blowing a conch. But when the situation is confused, one should talk ambiguously, like a snake with a forked tongue.

—Anonymous, 1688

In learning to talk to his patients, the doctor may talk himself back into loving his work. He has little to lose and everything to gain by letting the sick man into his heart.

—Anatole Broyard

A practitioner of experience does not seize the patient's forearm with his hand, as soon as he comes, but first sits down and with a cheerful countenance asks how the patient finds himself; and if the patient has any fear, he calms him with entertaining talk, and only after that moves his hand to touch the patient.

—Aulus Aurelius Cornelius Celsus, 25 BC-50 AD

From a modern doctor's perspective, a patient is a bundle of biological matter, a collection of tissues to be rolled in and out of treatment, x-ray, and operating rooms. A doctor needs to know nothing about the soul wrapped in those tissues.

—Lewis Mehl-Madrona

And I kept telling you I ached!

—Epitaph, anonymous

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http://www.acponline.org/medquotes/index.html

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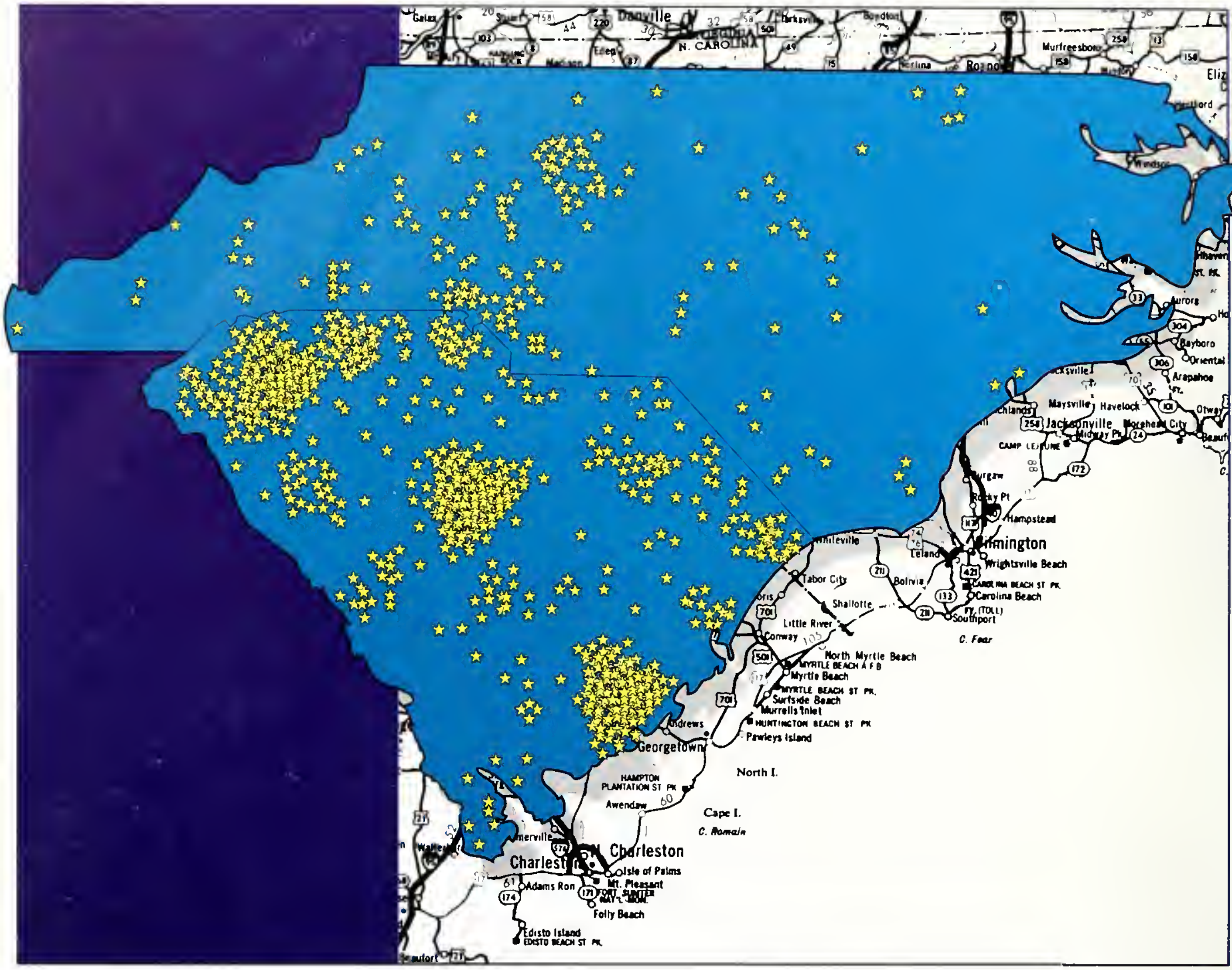

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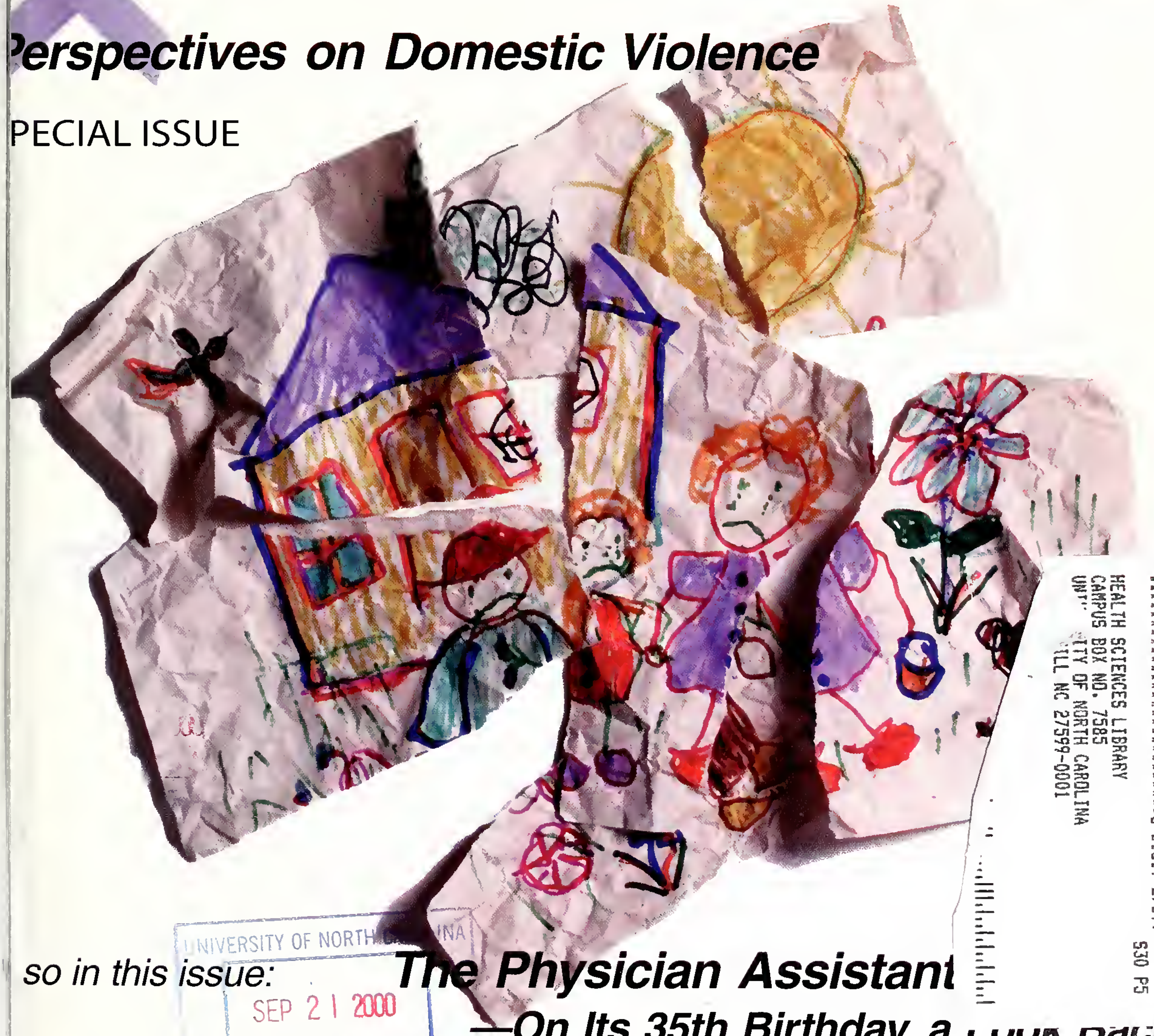
PECIAL ISSUE



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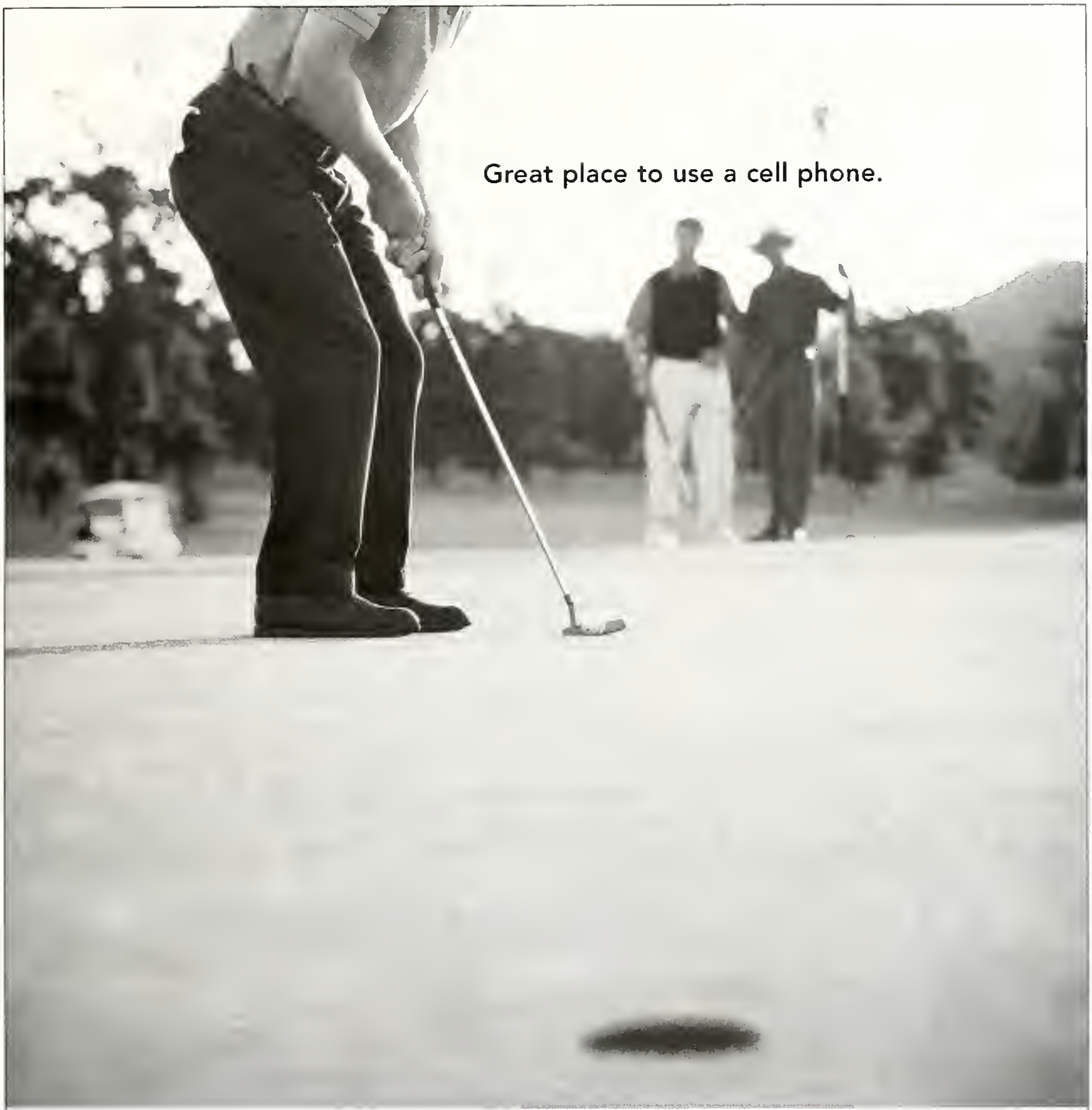
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For Doctors and Their Patients

September/October 2000, Volume 61, Number 5

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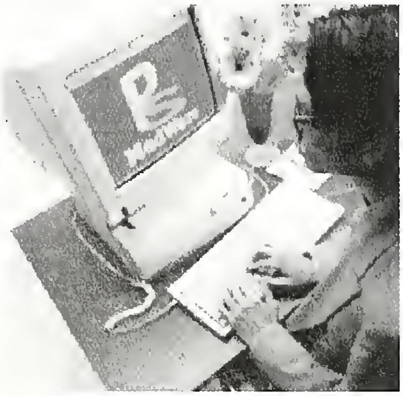

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FOR DOCTORS AND THEIR PATIENTS

September/October 2000, Volume 61, Number 5

Cover design and artwork by Florence Nash. Photography by Ed Mastin, Medical Photography, Duke Educational Media Services. The ribbon graphic, designed by Gerygraphics Electronic Imaging, symbolizes domestic violence prevention and awareness.

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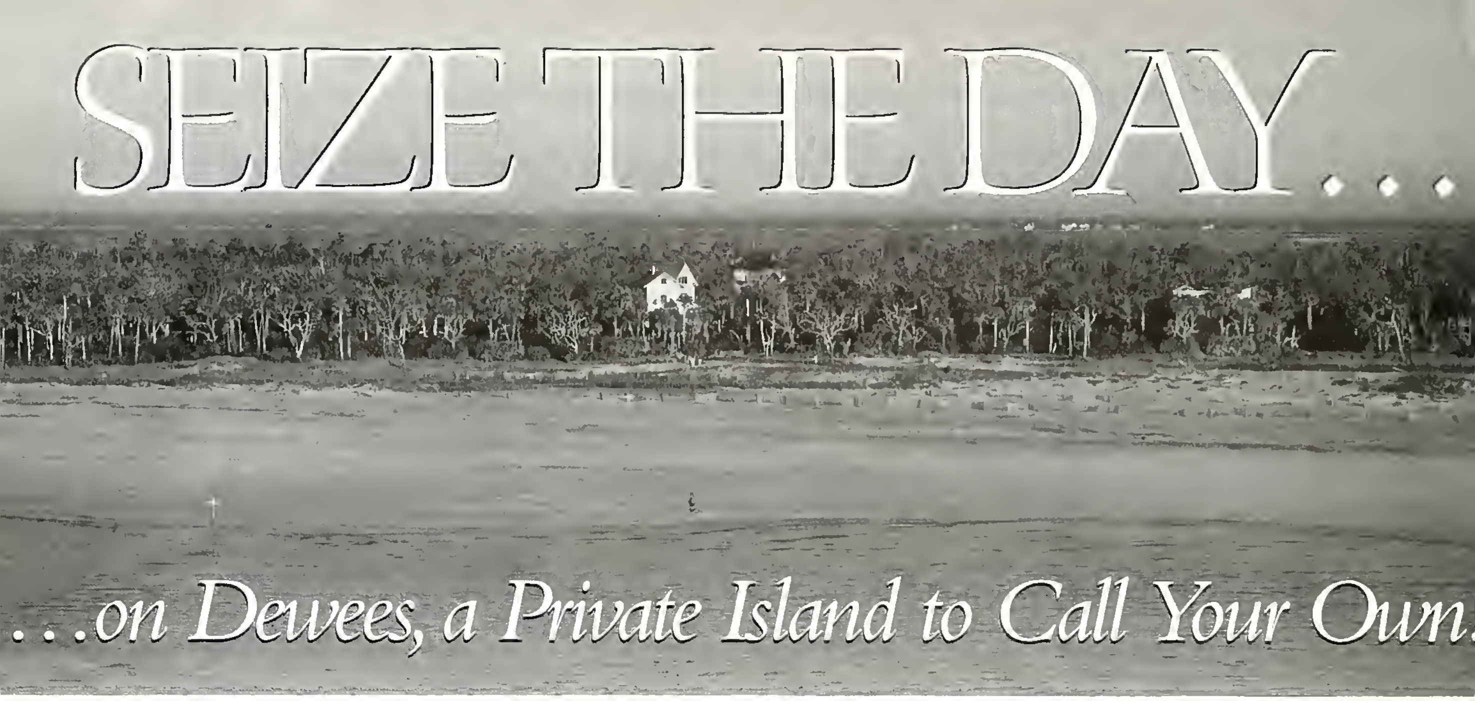

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Letters to the Editor

DHHS Links to NC Med J

To the Editor:

As a public information officer with the NC Department of Health and Human Services, I provide public affairs/ public information support to the Epidemiology staff in the NC Division of Public Health. That support includes web page content development.

Three of our Epidemiology staff recently published an article in your journal: "Ozone: The Good, the Bad, and the Ugly" [NC Med J 2000;61(2):84-9]. Rather than just post that article alone on our DHHS "Ozone and Your Health" webpage, I would like to add a link on our website to the *Journal* website. That would both provide access to the article itself and expand the public's awareness of your publication.

The *Journal* is a great resource for the public as well as for North Carolina physicians. We'd like to add a link to your homepage from our Division of Public Health page as well to give it even wider exposure. Would there be any problem with us providing those links?

Carol Schriber
Office of Public Affairs
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The Editor Replies:

No problem at all! We're delighted. This interactivity and information exchange is exactly what we want to achieve by creating a full online version of the *Journal*.

Correction Noted, Thanks

To the Editor:

In perusing the current issue of my favorite state medical journal, I read [State Health Director] Dr. McBride's assessment of the state of public health (N C Med J 2000;61:166-9). I note that the name of the current director of the National Science Foundation is misspelled. It is shown as "Caulwell," not, correctly, as "Colwell."

Stanley I. Music, MD, DTPH (Lond.)
PO Box 4
West Point, PA 19486

Pepper Spray Just Won't Go Away

To the Editor:

It will interest you to know that I made reference to your article on Health Hazards of Pepper Spray by Smith and Stopford [NC Med J 1999;60(5):268-74]in the following letter to the editors of the Ottawa [August 3, 2000]. The paper also published the link to the article. Of course, they published an edited version of my letter:

"*Pepper Spray is Dangerous, Even Lethal*

"I recently wrote to my member of Parliament concerning the use of pepper spray by police and other law enforcement agents, in particular during protest rallies.

"I urged Lanark-Carleton MP Ian Murray to demand a federal ban on the use of pepper spray by all law enforcement agencies, particularly for crowd control. There is considerable evidence that it leads to more violence and confusion. It can also be fatal for some people.

"A report on the health effects of pepper spray was published in the September/October 1999 edition of the North Carolina Medical Journal. It is available on the Internet at www.ncmedicaljournal.com/Smith-OK.

"The report's information is alarming but the message is clear. Pepper spray's chemicals are dangerous and can be lethal.

"In a letter sent to all MP's regarding last November's incident on Parliament Hill when homeless protesters were pepper-sprayed by officers from the Royal Canadian Mounted Police, the Coalition for a Federal Ban on Pepper Spray states: 'At least 12 people were pepper sprayed and six were taken to hospital for treatment. The RCMP did not give a verbal warning to protesters with the Ontario Coalition Against Poverty protesters before its use.'

"The coalition states: 'We call this a crime because pepper spray can cause the protective layer of the eye to become denuded, which can lead to blindness; cause severe pain to skin and mucous membranes; cause respiratory distress including an asthmatic attack and severe shortness of breath; and cause severe gastritis and diarrhea.'"

The letter as well as many articles on pepper spray can be found on the Internet at www.interlog.com/~cjazz/pepper.

There are also documented cases of death due to pepper

On June 7, the Inspector General
issued Draft Compliance
Program Guidance
for Physician Practices. . .

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spray in both the United States and Canada. The recent deaths in July of two men in Montreal after being pepper sprayed by police should alert most Canadians to this growing problem.

Jennifer Tsun
Lanark, Ontario, Canada
elphinseer@perth.igs.net

Medical Malpractice: 'Fixing' Is Not So Simple

To the Editor:

In his article on medical malpractice [NC Med J 2000;61(4):227-30], Dr. Guha makes many valid points, but I disagree that there is any one solution to the medical malpractice problem. Regulating expert medical case review and analysis would be a big step in the right direction, but it is simplistic to state that regulation of expert medical testimony alone would solve ‘most of the problems of medical malpractice.’

Analyses by Harvard researchers of adverse events occurring in hospitalized patients in New York, Utah, and Colorado demonstrate that iatrogenic injury is commonplace(3-4% of hospitalizations). Most adverse events are related either to surgery or to drug therapy. One-third to one-fourth of these adverse events stems from negligence.

The contention that it is possible to minimize medical errors by coercing ‘bad’ doctors to be ‘good’ stems from an archaic way of characterizing the etiology of most medical errors. When a patient suffers an adverse event, it signals a need to reassess the framework within which that patient received care in order to avoid future adverse events. Health plans and managed care systems should join hospitals and physicians in monitoring the quality of health care delivery, taking action when adverse events occur and assuming responsibility when injury occurs, regardless of whether a malpractice claim is filed. Let us move away from the bad apple approach to medical malpractice and toward making the entire health care system responsible for reducing medical malpractice.

Barton R. Paschal, MD
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Bioterrorism—a World-Wide Concern

To the Editor:

I would greatly appreciate a copy of the article "Bioterrorism: a new threat with psychological and social sequelae" [Smith CG, Veenhuis PE, MacCormack JN. NC Med J 2000;61(3):150-63].

Zalman Kaufman
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EDITORIAL

From the Guest Editor

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Chair, NCMS Domestic Violence Committee

Doctors are becoming increasingly aware of the public health, safety, and financial problems posed by domestic violence (DV). The law enforcement community has known about this for many years, but only over the past five years has it received much attention from the medical community. Physical abuse was once the sole province of emergency physicians; primary intervention and referral of victims went largely unattended.

This issue of the *Journal* presents several perspectives on the groups and issues involved with DV. In many parts of our state, emergency medical services (EMS) interact most often with the abused, because many of these victims cannot or will not seek medical assistance in emergency departments, clinics, or doctors' offices. Therefore, it is important that EMS personnel be aware of the issues and dynamics of DV to ensure the safety of their patients (and themselves) when they respond to a DV or assault call.

It is important to recognize the perspective and effects of DV on children in an abusive household. Even in cases where violence is focused on the partner, it can have unrecognized psychological effects on the children—confusion, fear and anger—which result in patterns of behavior that need to be recognized and addressed. Physical abuse is more obvious, but psychological abuse leaves no physical scars, which only makes it that much more difficult to diagnose. Too often, victims of psychological abuse develop coping mechanisms that make treatment or referral a frustrating challenge for those attempting to help them.

Another hidden facet of DV is elder abuse. It may persist unrecognized for 30 years or more, to be diagnosed only when a frail elder requires greater interaction with the medical community.

The doctor can play a key role in documentation, which provides information to referral agencies about existing circumstances and patterns of behavior, illness or injury. A well-documented record of episodes that have occurred can help victims of DV. Some doctors minimize incidents of DV because they fear retribution, or lengthy legal interactions, or they simply want to avoid opening a "Pandora's box." Good documentation techniques help both the doctor and the patient, and may lessen some of these concerns. The worst-case consequence of DV is homicide or suicide. But victims and their relationships often show characteristic patterns which, if detected, can alert health care professionals and help to avert these catastrophic events.

The goal of this special issue is to show these multiple perspectives, and to reinforce the idea that DV is not "just a legal problem" or "just an Emergency Department problem." It is everyone's problem; as doctors, parents, spouses, teachers, and members of society, it is our responsibility to do what we can to mitigate it.

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Physician Assistants

A Young Profession Celebrates the 35th Anniversary of Its Birth in North Carolina

Reginald D. Carter, PhD, PA, and Justine Strand, MPH, PA-C

The physician assistant (PA) profession began at Duke University Medical Center. It celebrates its 35th birthday on October 6, 2000. The national success of PA programs can be traced to North Carolina's leadership in developing and using this new kind of health care professional. The North Carolina Medical Society, North Carolina Medical Board, state legislators, and state agencies like the Office of Rural Health and Area Health Education Centers (AHECs) worked together to make the program a reality. The evolution of the profession has been described in several articles in the *North Carolina Medical Journal*.[1-5] We review here the development of the PA concept, the establishment of the profession, the expansion of the Duke curriculum from certificate to master's degree, and trends in practice characteristics of Duke PA alumni.

History and Background

In the 1950s Duke hospital faced an increased demand for services and a shortage of all types of nursing and allied health personnel. Dr. Eugene A. Stead, Jr., then chairman of the Department of Medicine, envisioned a physician's assistant as a way to provide clinical support[6-10] and to allow rural physicians to leave their practices to pursue continuing education opportunities. His experience at Emory University during World War II had convinced Dr. Stead that after two years of training individuals would be prepared to help doctors in patient care. In the 1940s, he had seen medical students help run Grady Hospital, while doctors were educated and deployed to the military in three years.

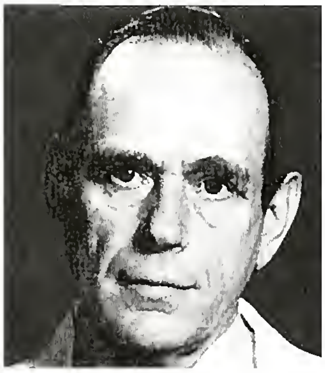

Figure 1. Dr. Eugene A. Stead, Jr., founder of the Duke PA program.

In the late 1950s and early 1960s, Dr. Stead and Thelma Ingles, RN, proposed a program to train nurse clinicians at Duke Hospital. Three times the National League of Nursing denied accreditation to the program, asserting that it was at least inappropriate and perhaps dangerous for nurses to assume medical tasks. Dr. Stead considered recruiting Durham firemen to his fledgling program, but then decided that veterans of the military medical corps were more suitable candidates.

On February 1, 1966, Dr. William Anlyan (Dean of the School of Medicine at Duke) appointed a committee to explore the potential roles for a PA, including education and experience requirements, and the scope of responsibilities. In September 1967, Dr. E. Harvey Estes, Jr., in the Department of Community Health Sciences, assumed administrative responsibility for the new program. Dr. Estes moved quickly to establish the concept in North Carolina and the nation. The first three PA students graduated at Duke on October 6, 1967.

A series of conferences held between March 1968 and April 1972 promoted the PA concept. The first two focused on curriculum development and ways to establish PA programs. The third solicited the leadership of organized medicine to set accreditation standards for PA education and to develop national certification through standardized examinations and continuing medical education requirements. Third party reimbursement, public and professional acceptance of PAs, hospital credentials, productivity and cost-benefits of using PAs, and professional liability issues were also discussed. The fourth conference drafted

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model state laws to enable physicians to use PAs in their practices. These conferences helped solidify leaders of the "PA movement" into a highly organized and effective team of health policy innovators.

Initial funding for the PA program at Duke came from an unlikely source. As a member of a study section of the National Heart Institute, Dr. Stead had been discussing informally the idea of training former military corpsmen as PAs. In 1965, Dr. Herbert Saltzman from Duke asked the Institute for funds to train hyperbaric chamber operators, as well as a more general type of assistant for physicians. The request was approved, launching the first formal training program of this type in the US. Until then, the Institute had supported the training of only MD and PhD candidates.

In December 1966, Dr. Stead received a three-year grant from the Josiah Macy, Jr., Foundation. Other grants followed from organizations like the Carnegie and Rockefeller Foundations and the Commonwealth Fund. In May 1970, on the second attempt, a national review board approved the North Carolina Regional Medical Program's request for partial funding of the Duke program (the board had been reluctant to fund an educational program that did not offer its graduates an academic degree). These funds were extended for another year in July 1970.

Dr. Estes, then chair of the Department of Community Health Science, and Dr. Robert Howard, the PA program's first full-time director, had been soliciting funds from various federal agencies since 1967. All attempts failed until congress passed the Comprehensive Health Manpower Act in 1972. This bill authorized support for PA training, and the Duke PA program received its first Bureau of Health Manpower grant in July 1972. The program relied primarily on federal funding until 1982. Today it is financially self-sufficient, using federal funds only to support minority recruitment and to place students in community-based clinical learning sites located in medically underserved AHEC regions of North Carolina and southern Virginia.

Legal Issues and Legislation

From the beginning, it was recognized that a new type of health care provider might face legal difficulties, given the complexity of laws licensing medical personnel.[11] The initial question was whether graduates' activities would lie outside the scope of work allowed for persons operating under mandatory licenses. In 1966, the North Carolina Attorney General issued an advisory opinion that the performance of physician-supervised activities would not contravene the licensure laws of the state. The program relied on this opinion until 1971, when North Carolina wrote an exception for physician assistants into its Medical Practice Act.

In 1969, a year-long project sponsored by the Department of Health, Education and Welfare and conducted by Duke's Department of Community Health Sciences determined the most desirable and feasible means of accommodating PAs into the legal framework of medical practice. The ultimate objective was to develop model legislation that, if enacted, would further establish the position of physician assistants. Two ideas dominated the discussion: (1) Since the PA role was ill-defined and the concept still evolving, legislation should preserve maximum role flexibility consonant with patient safety. (2) Because doctors are liable for the actions of their assistants, the doctor should determine the scope of a PA's practice. A final recommendation about exceptions to state medical practice acts made it clear that doctors may delegate tasks to assistants as long as they exert responsible supervision. Quality of care would be safeguarded by continuing vigilance of the supervising doctor.

On May 9, 1975, the North Carolina General Assembly passed "an act to limit the prescribing, compounding, and dispensing of drugs by certain persons approved by the North Carolina Board of Medical Examiners and the North Carolina Board of Pharmacy." This bill enabled PAs and nurse practitioners working in semi-autonomous settings (such as rural health centers) to prescribe certain drugs, waiving the requirement of a medical doctor's signature on all prescriptions. In February 1977 a deputy attorney general ruled that "North Carolina statutes proscribe registered nurses and licensed practical nurses from carrying out orders given by physician's assistants." In June 1977, the General Assembly amended the North Carolina Nurse Practice Act to correct this oversight and allow nurses to carry out patient care orders from a PA. Since the 1980s, North Carolina has been a leader in amending its laws and administrative rules to improve the effective use of PAs in the delivery of health care services. In 1993, the Legislature passed a bill enabling PAs or nurse practitioners to serve on the North Carolina Medical Board (formerly the Board of Medical Examiners). The first such person appointed by the governor was Wayne Von Seggen, a PA who now serves as the Board's president.

Program Accreditation

In December 1971, the House of Delegates of the AMA adopted "Essentials for an Educational Program for the Assistant to the Primary Care Physician," which established standards for the education of physician assistants. The Duke program was one of the first to be approved in 1972. The Duke PA program was re-accredited for the maximum period of 7 years in October 1996.

Evolution of the PA Curriculum

Dr. Stead saw the ideal candidate for an intensive two-year curriculum as someone with prior health care experience, as

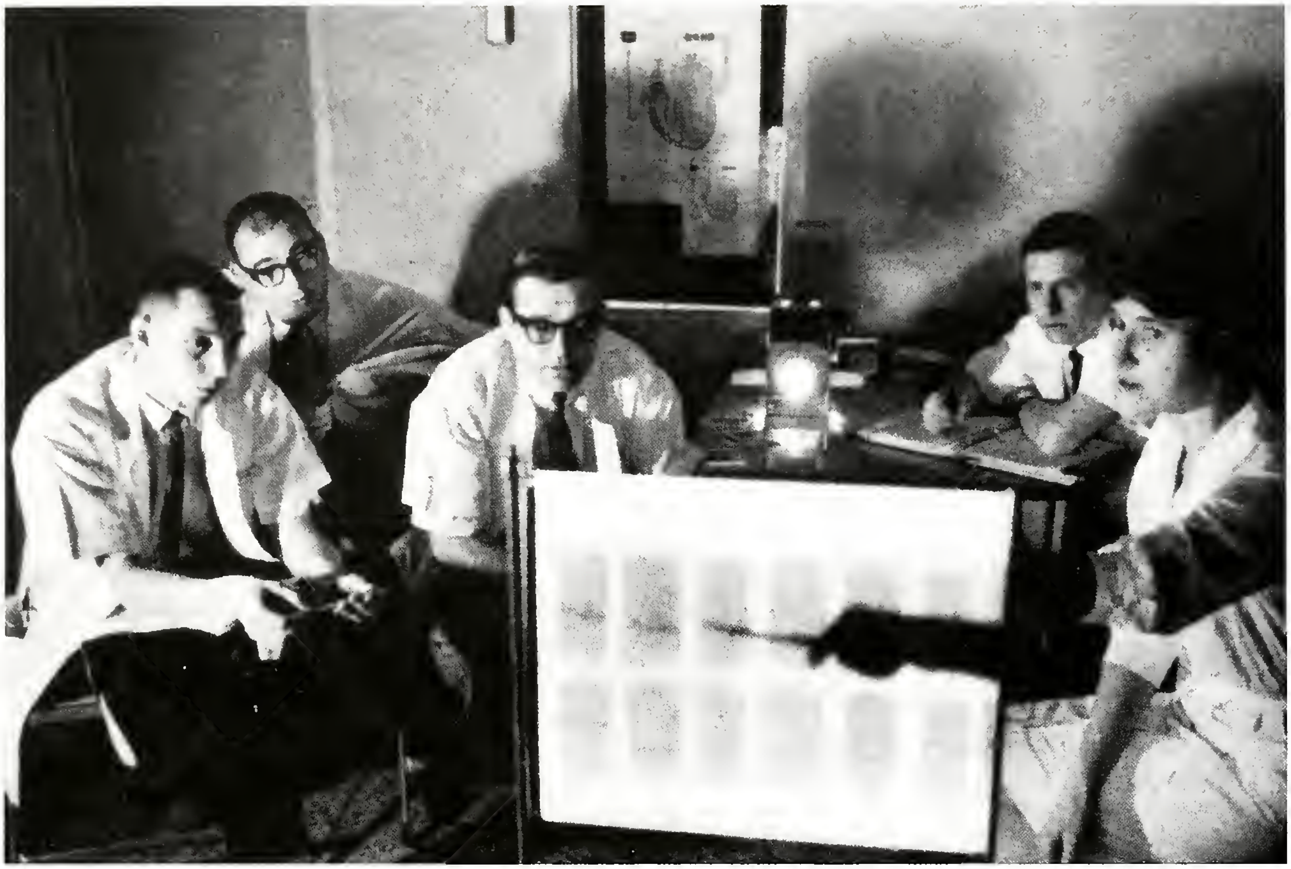

Figure 2. Nursing instructor Kathleen Andreoli teaches EKG interpretations to the first four physician assistant students enrolled at Duke (l. to r., Don Guffey, Vic Germino, Dick Scheele, Ken Ferrell). Photo reproduced from Look, September 6, 1966; produced by Roland H. Berg; photographed by Phillip Harrington.

in the military medical corps. He was not overly concerned about formal education nor about what type of certificate would be conferred at graduation. Stead believed that "a person with a high school education, a reasonable rate of learning, and a tolerance of the unavoidably irrational demands often made by sick people can learn to do well those things a doctor does each day. Under the wing of the doctor, such a physician's assistant can collect clinical data, including the history and physical examination, organize the material in a way which allows its use in diagnosis, and carry out any required therapeutic procedure which the doctor commonly uses."[12] Guided by this principle and with the approval of an ad hoc committee appointed by Dr. Barnes Woodhall, then Vice-Provost for Medical Affairs at Duke University, Dr. Stead launched his program in October 1965. The first four students, Victor Germino, Donald Guffey, Richard Scheele, and Kenneth Ferrell, were all former Navy hospital corpsmen, dedicated to providing health care services (Figure 2).

Stead recruited a clinically trained nurse educator, Kathleen Andreoli, RN, to organize the first nine-month didactic phase of the curriculum. Andreoli had been instrumental in setting up the nursing component of the cardiac care unit in 1965 under the direction of Dr. Andrew Wallace. Wallace was named medical director of the PA program and, with Stead, Andreoli, and Mr. James Mau, an administrator in the Department of Medicine, formed the program's academic and administrative team. Hospital conference rooms were used for lectures, and the adjoining wards were used to teach physical diagnosis and history-taking skills. Students learned laboratory, surgical, and clinical skills in the work setting. Formal instruction consisted of 140 hours of clinical medicine and nursing, 60 hours of anatomy and physiology, 60 hours of pharmacology, 100 hours of animal surgery, and 90 hours of electronics instrument theory and troubleshooting. Hospital doctors, nurses, and support staff gave lectures and taught students clinical, nursing, and technical skills. Student feedback was immediate, and schedules and content were changed as needed. The students were opportunistic learners. They shared with each other the skills and knowledge learned in the Navy and didn't hesitate to ask house staff to let them see interesting cases in return for doing routine clinical tasks. During the second year, students were assigned to various teaching services and clinical laboratories at Duke Hospital, Durham Veteran's Administration Hospital, Lin coln Hospital in Durham, and the North Carolina State Prison clinical facilities in Raleigh.

There had been little publicity about the program before the first class was selected. This changed dramatically after articles in the Reader's Digest[13] and Look Magazine[14] announcing the new Duke program to the public. The first four students had been hand-picked from a small pool of applicants; 200 people applied for the second class and over 1000 for the third class in 1967. Class size quickly expanded; there were four part-time and nine full-time students in the class of 1968 and 12 students in 1969. More students meant new challenges—to secure adequate classroom space and laboratory facilities, and to redefine the content of the curriculum and teaching methods.

In 1967, Stead stepped down as chairman of the Department of Medicine, and the PA program moved its base of operation to the newly created Department of Community Health Sciences. Dr. Harvey Estes, Jr. appointed Dr. Robert Howard as the program's first full-time medical/program director. A family doctor, Howard had just left the Air Force and was used to working with corpsmen. Howard recruited Mr. David Lewis, whose background was in public education, as assistant director. A classroom trailer was purchased to house students, and the curriculum was expanded and formalized. Based on student feedback and criticism, basic science instruction was expanded, and PA students were treated more like medical students than technicians on clinical rotations. The medical instruments course was replaced by courses in microbiology, human growth and development, and clinical laboratory procedures. Clinical learning opportunities increased, and community physicians began accepting PA students into their practices. Other academic medical centers began requesting Duke PA students to test the feasibility of undertaking similar programs, or to test the concept of using PAs to bolster the practices of their clinical staff.

The core curriculum was designed to educate generalist PAs, but in 1968 the program experimented with specialist training in surgery, radiology, and psychiatry. Dr. David C. Sabiston, Jr., chairman of the Department of Surgery, Dr. Thomas T. Thompson, chief of Radiology at the Durham Veteran's Administration Hospital, and Dr. Marvin J. Short, a psychiatrist based at Broughton Hospital in Morganton, NC, were instrumental in establishing specialty rotations for PA students.[15,16] The radiology and psychiatry modules required students to spend an additional four months in training, after which they were issued certificates as "Physician's Assistants in [Psychiatry or Radiology]." This inscription caused some PAs problems when they later sought employment as generalist PAs, because most medical boards viewed the special designation as a limitation, not an expansion, of scope of practice. Specialist certificates were abandoned in 1972 shortly after the University approved awarding bachelor's degrees to PA graduates. The accreditation standards for the education of primary care PAs adopted by the AMA in 1971 and the Federal Government's 1972 requirement that grants be awarded only to PA programs educating PAs for primary care practice also contributed to their abandonment. Remaining innovative, Duke began educating PAs for the US Coast Guard in 1971 and joined the School of Pharmacy at the University of North Carolina at Chapel Hill to train pharmacist PAs–a forerunner of today's clinical pharmacist. The UNC collaboration lasted two years, but the training of PAs for the Coast Guard continued until 1990 when Duke decided to award the master's degree to its graduating PAs.

In 1968, Dr. Howard explored awarding academic credit for courses offered by the PA program. He felt the caliber of the curriculum was "at or above the level of general college course work." He was also aware that five months earlier the Commonwealth Foundation had funded Dr. Hu C. Meyers at Alderson-Broaddus College in West Virginia to prepare "college-trained" PAs. On September 19, 1969, Estes and Howard proposed to Dr. Thomas D. Kinney, Dean of Medical Education, and Dr. William Anlyan, Vice President for Health Affairs, that a bachelor's degree be made optional for PA students who met general undergraduate requirements. The university provost held a series of meetings to resolve whether the undergraduate college or the medical school should grant the degree. Estes, Howard, and Kinney wanted it in the medical school since the program's faculty was based there and other baccalaureate programs were being considered (for pathology assistants and nuclear therapists). All parties finally agreed that the medical school should establish requirements for a Bachelor of Health Sciences (BHS) degree for allied health programs. The medical center's administration granted permission to offer the degree on September 1, 1971—and entering students learned that they would have to pay tuition for the first time. The bachelor's degree required the basic science departments to teach courses to allied health students, and the chairmen of several departments balked at the idea of teaching students who did not have proper college prerequisites. Estes and Howard felt that demanding prerequisites of all students would destroy the original intent of providing career entry to corpsmen, licensed practical nurses, and other clinical personnel with "non-academic" health care education and experience. They resisted attempts to divide students into two groups to be taught basic sciences by different faculty according to degree eligibility. Stead waded into the conflict, reiterating his position that PAs needed a more applied basic science course than that taught to medical students. He argued that in most cases such a course could be taught better by practicing physicians than by basic scientists. Compromises were reached, and on May 16, 1972, the Medical School Advisory Committee agreed to go ahead. Twelve students were awarded the BHS degree on May 4, 1973.

Howard and Lewis left the program in 1972 and moved to Florida to establish a family medicine residency and PA

Table 1. Demographic profile of PA classes at 5-year intervals

Class	Total	Men Number (%)	Women Number (%)	Minorities Number (%)
67-71	71	67 (94)	4 (6)	5 (7)
72-76	203	166 (82)	37 (18)	15 (7)
77-81	198	116 (59)	82 (41)	13 (7)
82-86	192	92 (48)	100 (52)	10 (5)
87-91	196	55(28)	140 (72)	20 (10)
92-96	203	56 (28)	148 (73)	26 (13)
97-00	174	47 (27)	127 (73)	37(21)
Total	1237	599 (48)	638 (52)	126(10)

Data do not include 60 students (42 men and 18 women) who withdrew before graduating. This group includes 18 minorities. Percentages may not be exact because of rounding.

program there. At the time of their departure, student enrollment had risen to 40 students per year, and classroom and laboratory space were made available in a newly constructed allied health building on the Durham Veteran's Administration Hospital campus. Reginald Carter, PhD, a physiologist, was recruited to replace Lewis, and Estes served as program director until Dr. Michael Hamilton, a general pediatrician working at Lincoln Hospital in Durham, was recruited to fill this position in 1975. Carter was responsible for assuring that the curriculum conformed to University degree and AMA accreditation standards. He completed course work as a part-time student and became a PA himself in 1978.

Based upon his experience as a student and the recommendation of accreditation site visitors to teach more preventive medicine and behavioral science, Carter proposed a complete overhaul of the first year curriculum. It would reduce the time devoted to basic science by integrating course content and minimizing duplication of effort. The curriculum was streamlined so that content of one course built on that of parallel courses. For example, students learned head and neck anatomy at the same time they were learning how to examine these regions in physical diagnosis. The clinical medicine course focused on the 100 most common clinical problems seen in primary care practices; radiology, ECG interpretation, therapeutics, and preventive health measures were integrated into the course where most appropriate. The chairs of clinical and basic science departments were asked to support the new curriculum, and, with their approval, the Allied Health and Medical School Advisory Boards implemented the integrated, competency-based curriculum in 1980.

While Carter worked on the first phase of education, Hamilton worked to improve clinical training. The accreditation site visitors felt that students spent too much time in hospital-based inpatient and ambulatory clinics and not enough time in community-based primary care clinics. Hamilton used the newly created family medicine residency program to establish a team practice clinic in southern Durham. This clinic, which opened in 1981, offered interdisciplinary education opportunities for family medicine residents and medical, nursing, and PA students.

By 1980, the PA curriculum was in the hands of a small group of educators based in the Department of Community and Family Medicine. The program was recognized for its innovative use of standardized patients to teach physical diagnosis and patient assessment skills, and for its development of computer-based systems to manage and evaluate the curriculum. Carter became program director and chief of the PA Division in 1985 when Hamilton moved to a part-time role. Dr. Joyce Copeland assumed the role of medical director in 1990.

By 1985 most PA students already possessed bachelor's degrees, so several PA programs began offering their graduates advanced degrees. In 1987, the Duke program asked the medical school to establish a Master of Health Sciences degree and award it to PA graduates. Associate Program Director Patricia Dieter, MPA, PA-C, developed the proposal; it had the support of Dr. George Parkerson, Jr., chair of the Department of Community and Family Medicine, Dr. Doyle Graham, Dean of Medical Education, and Dr. Ralph Snyderman, Chancellor for Health Affairs, and was quickly endorsed. Courses in epidemiology, research, and health systems were added to the curriculum and, unlike the BHS proposal, the MHS proposal moved smoothly through all the necessary committees. It was approved, with a few minor modifications, by the Academic Council in January 1989; students entering the program in 1990 were awarded the MHS degree. Because the BHS curriculum had already been taught at an advanced level, the Provost allowed former graduates who had a bachelor's degree on matriculation to return to Duke to complete additional coursework and receive an MHS degree. During the next five years, over 100 alumni completed the work needed for the MHS degree.

In 1996, students moved into new educational facilities provided by the medical school. The space consists of a state-of-the-art multimedia classroom, small conference rooms, and a clinical-skills laboratory. Each student workspace provides computer connection to the university's Common

Services Network and the Internet. Students lease laptop computers during the two years they are enrolled in the program. Course syllabi, assignments, handouts, lecture notes, links to electronic journals, and other learning resources are available by computer. Quizzes, examinations, and course evaluations are administered and analyzed by computer.

Table 2. Prior health care experience of students at matriculation, at 5-year intervals

Class	Total	Medical corpsman	Pt. care assistant	Clinical techician	EMT	Nursing	Other
67-71	71	57	4	5	0	2	3
72-76	203	99	39	14	5	13	33
77-81	198	62	58	21	6	19	32
82-86	192	20	64	14	30	17	47
87-91	196	9	14	15	27	12	84
92-96	203	0	41	55	11	6	88
97-00	130	1	76	36	19	6	36
Total	1237	250	331	160	98	75	323

Clinical technician: medical technologist, clerical and research technicians. Other: social workers, counselors, pharmacists, health care administrators and other allied health professionals.

Table 3. Practice characteristics of 610 Duke PA alumni

Practice setting	
Hospitals and institutions	43%
Offices	33%
Clinics	20%
Other	4%
Type of practice	
Primary care	53%
Surgery	23%
Internal medicine	19%
Other	5%

The PA program now enrolls 44 students annually. The curriculum runs for 25 months (a 12-month preclinical phase and a 13-month sequence of clinical rotations). The highly integrated preclinical curriculum presents content in manageable units. Course work consists of lectures, small group and computer-assisted tutorials and patient case simulations, laboratory sessions, and standardized patients. After the first semester, students perform weekly evaluations (history and physical examinations) of hospitalized or ambulatory patients. The clinical rotation year is divided into four- and eight-week blocks. There are eight core rotations—inpatient medicine, general surgery, emergency room/surgery outpatient, pediatrics, behavioral medicine, obstetrics and gynecology, outpatient medicine, and research—with the remaining time devoted to electives. Two clinical rotations must be completed in medically underserved settings. All students complete basic and advanced life support instruction. They must pass computer-based examinations after each required rotation, as well as a series of problem-oriented patient assessment examinations observed and evaluated directly by faculty. Students are awarded MHS degrees in May and PA certificates of completion in August of their second year.

In 1998, Justine Strand, MPH, PA-C, became chief of the PA Division; Carter continues as program director. The division is expanding postgraduate educational offerings for PAs in leadership management skills, faculty development and occupational and environmental medicine.

Student Trends

Tables 1 and 2 show trends in gender, ethnicity, and prior health care experience of entering students over 35 years. Former military corpsmen made up the initial pool of candidates for the program, but it soon became apparent that the program offered new career pathways for those in allied health and nursing professions who wanted to expand their roles in patient care. Prompted by federal funding aimed at increasing the number of women and minorities, women began replacing the dwindling number of military corpsmen. From 20% in 1975, the enrollment of women grew to 50% by 1985 and 72% by 1995. The ratio of women to men is now 3:1. Since 1980, the number of students from medically underrepresented groups and disadvantaged backgrounds has increased seven-fold from 5% to 34% of the class entering in 2000. Students from minority or economically/educationally disadvantaged groups now constitute 25-30% of the class.

The curriculum has evolved from certificate to baccalaureate to master's degree status, and the educational level of

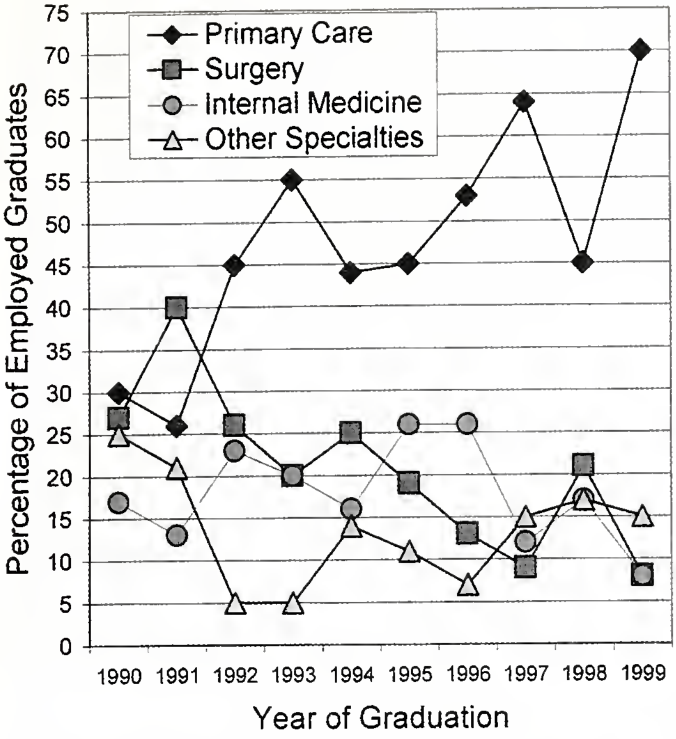

Figure 3. Specialty choices of new PA graduates 1990-1999.

enrolling students has evolved as well. In the first five years of the program, fewer than 10% of students entered as college graduates; this percentage gradually increased so that for the past decade all students have college degrees when they enter. Today's student is typically between 25 and 32 years old; the average age of entering students has increased from less than 26 years old at the start of the program to nearly 29 years old now. On the other hand, the number of years of prior health care experience obtained by students before entering has declined since 1967 (from almost 5 years to a steady average of 3.5 years now). The average entering student has a grade point average of 3.2-3.6 (up from 2.6 during the first decade of the program), has earned 40-70 natural science credits, and has Graduate Record Examination scores of between 1680-1840.

Practice Trends

The 1237 graduates of Duke's PA program are employed in 48 states, mostly in the south, southeast and northeast; 417 work in North Carolina. Their work settings reflect the primary care emphasis of the program. Of the 610 alumni who responded to our two last surveys, 53% practice in primary care settings (family medicine, general internal medicine, pediatrics, urgent care, and obstetrics/gynecology) (Table 3).

A gradual trend over the past 10 years finds more students working in primary care and far fewer in surgery (see Figure, page XXX). In 1990 and 1991, fewer than 30% of students entered primary care practices; in 1999 only 30% did *not* choose primary care careers. In 1992, funds from the Duke Endowment and the federal government, allowed the program to renew its efforts to attract individuals interested in primary care ambulatory medicine, especially in rural, medically underserved communities of North Carolina. Today, only 30 % of Duke PA students' clinical education takes place in the Duke University Health System, the rest is based in community and institutional practices in North Carolina and southern Virginia. The program works closely with four AHECs—in Fayetteville, Wilmington, Rocky Mount, and Asheville—to place students in medically underserved communities.

Over the past ten years, salaries paid to PAs have increased at an annual rate of 5% per year from an average of about $35,000 in 1990 to $55,000 in 1999. Over the past four years, the rate has slowed to 3.75%, because more students have chosen less lucrative primary care positions. About 30% of Duke PA graduates work in areas with a shortage of health professionals. Employment opportunities are generally good, and the average Duke graduate can expect to earn about $55,000 upon completion of training. Mid-range salaries of graduates working for more than five years range from $48,000 and $70,000, not including fringe benefits.

Conclusion

The physician assistant profession went from concept to reality in only 35 years, thanks to the innovative thinking of Dr. Eugene Stead and the support and commitment of countless North Carolina physicians. There are now more than 38,000 PAs in the United States, and more than 1,500 practice in North Carolina. PAs have nationally standardized accreditation, board certification, and mandatory recertification.

A positive practice environment enables full use of PAs in North Carolina. In company with their supervising doctors they improve access to health care for the state's citizens. PAs are eligible to join the North Carolina Medical Society, which has an active PA section, and to participate on its many committees.

Alumni of the Duke Physician Assistant Program have provided leadership for the profession since its inception. Duke University PAs formed the American Academy of Physician Assistants in 1968. They have held leadership roles in national and state organizations, and they have founded PA programs across the country. Perhaps most important, they have established a record of service in primary care, particularly in rural and medically underserved citizens in North Carolina and throughout the country.

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A word from Dr. Stead:

It's great to be number one in national rankings. Most proponents of the Duke medical school are used to being ranked in the top 20, but the Duke PA program is the only component always ranked in first place year after year.

Congratulations to its leader, Reginald Carter, to his faculty, and to the student body, and to the North Carolina Medical Society, whose members have always ably supported the PA program.

Eugene A. Stead, Jr., MD

A Word from Dr. Estes:

Few of us have the opportunity to participate in the birth and rapid development of a new profession. I was very fortunate to be on Dr. Eugene Stead's team when the Physician Assistant program was conceived, and even more fortunate to be in a position to "take over" the Duke program when Dr. Stead retired from his role as Chair of Medicine in 1967. I hope that I have had a positive effect on the profession, but its remarkable success is clearly due to the PAs themselves, the men and women who chose this path, and to their wise decisions.

PA education was patterned after medical education, but there are important differences. PA education aims at producing a generalist, and all graduates take a certification examination covering the knowledge and skills required in primary care. PAs must be recertified every six years, and the generalist content of this exam is the same, no matter what specialty the examinee has pursued since the last exam. A PA who has worked in orthopedics, or endocrinology, or pediatrics must demonstrate knowledge of generalist topics.

Recertification, and the requirement that all must pass the same recertifying exam, has had a remarkable effect, which physicians should view with envy. This common experiential thread has, in my opinion, caused the PA profession to be a more unified and cohesive professional group than the medical profession. They attend meetings in much higher numbers, they attend a variety of clinically oriented lectures on general medical topics, and they share experiences and problems across their specialty boundaries. Political and economic issues are discussed, as they are in medical meetings, but the basic purpose of preventing disease and treating illness is always the dominant theme.

This is one of many lessons we can learn from our Physician Assistant colleagues. I invite all physicians to learn from them as they rub shoulders with PAs in their practices, and in interactions in the North Carolina Medical Society.

E. Harvey Estes, Jr., MD

Isaac N. Northup, Jr. James P. Cooney Richard L. Vanore Thomas E. Harris Robert D. Walke

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Brainwashing and Battering Fatigue

Psychological Abuse in Domestic Violence

Lesly Tamarin Mega, MD, Jessica Lee Mega, MS IV, Benjamin Tamarin Mega, and Beverly Moore Harris, MD

Abstract

Intimate partner violence occurs often in the United States; it involves an interrelated combination of physical, sexual, and psychological abuse, usually directed against women. The psychological aspect deserves special attention because victims who lose their independence, self-esteem, and dignity tend to remain in abusive situations. The abuse is perpetrated by a domestic partner to maintain power and control in the relationship. To assert control, the abuser uses "brainwashing tactics" similar to those used on prisoners of war, hostages, or members of a cult. Common features of brainwashing include isolation, humiliation, accusation, and unpredictable attacks. The abusive environment produces real and anticipated fear, which contributes to the battered woman's belief that her situation is hopeless and that she must depend on her abuser. She develops coping strategies to deal with her oppressive environment, but eventually exhibits symptoms of "battering fatigue," similar to the battle fatigue of soldiers in combat who, like battered women, live in fear of being killed or severely injured. Recognizing the state of mind of these women can help us understand why it is difficult for them to flee their traumatic environment and why they may resort to suicide or homicide. For healthcare providers to screen and treat their patients adequately, it is imperative that they appreciate the complex and devastating psychological aspects of domestic violence.

SR had been beaten by her husband repeatedly during their seven-year marriage. She was three months pregnant, but her husband would not allow her to visit a doctor or tell anybody about the pregnancy. An argument arose when her husband demanded that she have an abortion. As he was kicking her in the abdomen in an attempt to kill their unborn child, she hit him on the head with an ax handle, accidentally knocking him into a kerosene heater. He died from the burns. SR was sentenced to 80 years in prison for the "murder" of her husband.

Intimate partner violence is a major health problem in the United States. It affects people from all backgrounds. It includes physical, sexual, and psychological abuse. Whether they are aware of it or not, doctors of all specialties treat people suffering from intimate partner violence. The extent of the problem is shown by the fact that more than 50% of women ever presenting to an emergency department for any reason have been abused at some time in their lives.[1] Many of us are familiar with the physical abuse that these patients endure, but successful treatment requires understanding psychological abuse, which often leads to loss of self-esteem, dignity, and independence. O'Leary found psychological abuse was rated as worse than all but the most extreme levels of physical violence.[2]

In this paper we describe the psychological condition of battered people like SR, and explain how their coping responses and symptoms represent reactions to extremely traumatic situations. Understanding the state of mind of these women can help us see why they remain in abusive relationships and even find themselves in a position of having to kill or be killed. In addition, we will stress that doctors can work with other professionals to stop the violent legacy of substance abuse, suicide, and homicide. Doctors can play a crucial role in the detection, treatment, and legal defense of battered women by recognizing their state of mind.

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The Battered Woman Syndrome

Historically, "domestic violence" or "intimate partner violence" has been described as more than one entity, a continuum of abusive relationships. It has been thought of in two categories:[3] (1) an "interactive type" of battering, and (2) the "Battered Woman Syndrome,"[4] differentiated by what precipitates the abuse. Women involved in interactive abuse often seem to precipitate the attacks and more often file charges. However, we don't know what led up to these attacks. This form of abuse is less common according to Saunders, whose study of battered women found that only 8% used nonsevere violence to initiate an attack.[5]

The abused women discussed in this paper fall into the category described by the "Battered Woman Syndrome." Lenore Walker originally defined this syndrome,[4] in which the male partner is the precipitator of violence. Walker described the "Cycle of Violence," a three-stage cycle that was predictable to the victim. It consists of (1) a buildup of tension, (2) the battering, then (3) a making-up. The result is psychophysiological stress and low self-esteem. The "loving" make-up phase is a calm respite that falsely raises the battered woman's hopes.[6] The cycle of violence theory was questioned because it was not present in some abusive relationships and also because it implied that abuse was predictable and intermittent, thereby obscuring the ever-present controlling behavior of the batterer.[7] Walker later emphasized that the syndrome should be conceptualized in terms of the victims' reactions and psychological symptoms. She and others have suggested that the battered woman syndrome is similar or identical to post traumatic stress disorder (PTSD). Presently, the definition of the syndrome varies depending on whether it is used in a psychological, medical or legal framework.

"Brainwashing has five common features: isolation, unpredictable attacks, accusation, humiliation, and threats."

To better comprehend the lives of battered women, one must appreciate the ongoing, interrelated nature of physical, sexual, and psychological abuse. Abuse is perpetrated by a domestic partner to maintain power and control in the relationship. To accomplish this, the abuser uses "brainwashing tactics" similar to those used with prisoners of war (POWs), hostages, or members of a cult. Brainwashing has five common features: isolation, unpredictable attacks, accusation, humiliation, and threats. It produces an environment of real and anticipated fear, contributing to the battered woman's belief that her situation is hopeless and that she is dependent on her abuser. The battered woman may find ways to cope with the oppressive environment, but eventually she develops symptoms of "battering fatigue," similar to the battle fatigue of combat soldiers, who also live in constant fear of being killed or severely injured. Grant's 1995 study of battered women supports this formulation. The women in her study repeatedly emphasized the psychological abuse and torment they experienced. Interestingly, and possibly as a result of brainwashing, many of these women spoke of their partners' needs, not their own. They seemed to be describing battering fatigue when they referred to the violence they had experienced as, "a blur, one episode melting into the next."[8] No one—regardless of background, financial status, or personality type—is immune from the battered woman syndrome.[9] Many previously competent, independent women, once victimized, become "anxiety-ridden, confused, depressed, suicidal, helpless, and full of guilt and shame."[3] In other words, "battered women are not 'sick' but they are in a 'sick' situation."[10] Their coping behaviors represent a response to their traumatic environment, and their symptoms, a response to the stress they experience.

The "Battered Woman Syndrome" might properly be termed the "Battered Spouse (or Partner) Syndrome" because men can be abused, but few cases of severe intensity have been reported. Women are victims of intimate partner homicide about eight times more often than men, and women are assaulted by their partners seven times more often than men are.[11] However, the number of male victims may be underreported, influenced by male stereotyping: men may be less willing to reveal themselves as victims, and authorities may be less sympathetic to their complaints. Similarly, when intimate partner violence occurs in same-sex partnerships, the abused partner often does not report it because of anticipated condemnation of the relationship.

The Brainwashing Process

Battered women often remain in abusive relationships because brainwashing has led to acceptance of the situation and even an idealization of the abuser. The primary perpetrator of the brainwashing is the abused person's partner. Morgan, comparing the abuser's tactics to those of the political terrorist, referred to the process as "conjugal terrorism."[12] Conjugal terrorists use or threaten to use violence to break down the resistance of their partners and control them. Tolman, in a survey of 407 men and 207 women in a domestic violence program, found dominance-isolation and emotional-verbal abuse elements in their relationships.[13] In the "Chronic Battered Syndrome," Steinmetz described how brainwashing produces fear, isolation, guilt, and emotional dependency in victims,[3] and Browne pointed out that abused women develop survival skills rather than escape strategies, similar to the situation with POWs.[14]

Physical and emotional isolation are features of brainwashing in POWs, hostages, members of cults, and battered women. Abusers often deprive their partners of social support by limiting contact with friends and family. The battered women are rarely left without supervision. Abusers may insist that both partners work at the same site, or they may forbid the opportunity to work at all, thereby creating financial dependence. Abused women become further isolated by trying to hide the violence, fearing that society will blame or shun them. They may be afraid to involve others, believing that the abuser may harm those others. Isolation makes abused women more receptive to their partners' negative suggestions and reinforces the development of new values and behaviors. The victim's only validation of her self-worth comes from the very person imposing her isolation.[15]

The unprovoked nature, the unpredictable timing, and the uncontrollability of attacks contribute to the brainwashing. Maria Roy found that in 15% of cases, unprovoked wife assault began early in the relationship, often during the honeymoon.[16] The inability to control the attacks can lead to a state of mind somewhat analogous to "learned helplessness,"[17] a psychological paralysis seen in caged dogs subjected to electrical shocks at random and varied intervals. The dogs first try to escape, but give up when they learn that they can not control the situation. Similarly, cult victims subjected to unpredictable positive—and negative—reinforcement became unable to evaluate the cult system or separate from it. Prevented from escaping or commenting on the situation, cult members, like experimental dogs, did nothing to change it. They became ambivalent about their own values, opinions, and decision-making capabilities.[18]

"A study of 12 abused women who killed their spouses indicated that psychological abuse by extremely jealous and possessive abusers may be more detrimental than physical abuse."

Battered women, too, can feel "caged" within their homes, subjected to unprovoked and unpredictable attacks, and unable to stop them. Their inexplicable acceptance of the situation may be a form of learned helplessness. However, it must be emphasized that they are not globally paralyzed, for they continue to find coping mechanisms to protect themselves and their children. They may try to avoid visual contact with the abuser, to appease him or prevent him from hurting their children by sending them to another room. They may abuse alcohol or drugs or develop trance-like, dissociated states to cope with their psychological and physical pain.[19]

A third common feature of brainwashing is that pain is followed by "kindness." This "bad guy/good guy" tactic continues the control process by confusing the victim and increasing her dependency on the abuser. With no visible escape, sudden kindness from her abuser gives the woman false hope that he will change. Of course, sometimes his behavior seems relatively positive only because the violence has temporarily stopped.[10]

In a 1993 study of battered and emotionally abused women, Dunton and Painter found that intermittent bad/good treatment led to a paradoxical attachment to the abuser.[20] In 1942, Anna Freud explained this type of behavior as "identification with the aggressor."[21] This mental state has been compared to the "Bettelheim Syndrome," referring to those concentration camp inmates who coped psychologically with their traumatic environment by identifying with their guards in hopes of survival.[22] Unable to change their situation, they became depressed, showed little anger toward their captors, and did not try to escape. They could see few alternatives and those few appeared too dangerous.[23] Marcus, in 1999, explained the Bettelheim Syndrome as a way for people living in extreme situations to maintain their autonomy.[24] This may be a significant reason why 75% of battered women seen for medical injuries return to abusive relationships.[25]

Guilt is a fourth element in brainwashing. Victims who feel guilty feel they deserve punishment.[3] In a study of 30 abused women, Landenburger found that the words "blame," "shame," and "responsibility" came up often.[26] Many battered women are falsely accused of infidelity and adultery by over-controlling husbands.[16] This is reminiscent of hostages who are blamed for their governments' actions or of POWs who are accused of killing innocent people. Repeated, false accusations can be psychologically devastating. A study of 12 abused women who killed their spouses indicated that psychological abuse by extremely jealous and possessive abusers may be more detrimental than physical abuse.[27]

In addition to producing guilt, repetitive degradations lower the battered women's self-image. The women are called "ugly," "fat," "trash" and "rejects." The low self-esteem created by this debasing language can lead the abused women to believe they are undesirable and unworthy. They stay with their abusers because they feel no one else would want them.

Professional advisors, family, friends and society sometimes reinforce the battered women's feelings of guilt and low self-esteem. Comments like "He can't help his temper because he comes from a terrible background; you need to show more sympathy," or "A good woman can change a man," or "You know, you shouldn't upset him when he's drinking," make women feel responsible for inducing the abusive behavior. They become convinced that they cannot survive without the partner when others say, "You and your children will starve if you leave him." The women may feel pressured by those who say, "You've got to stay in the marriage for the sake of the children." Feelings of guilt and inadequacy can lead the women to be thankful that their abusive husbands "tolerate" them. Some professionals also contribute to this process by saying, "Whether you know it or not, you must be getting something out of this relationship or you wouldn't stay." Or, "If you want my help, you need to file a complaint, and leave him." These ostensible helpers are inadvertently blaming, criticizing, or coercing the victim instead of appreciating her psychological condition and dangerous physical environment.

Fear is the fifth and most powerful element in brainwashing. It is an important part of the other elements. Besides the actual physical assault, the anticipation of assault creates an extremely fearful existence, and makes battered women grateful just to survive. Studies showed that most battered women did not defend themselves for fear it would worsen the situation. They tried to remain passive and protect themselves or to escape temporarily.[28] They feared for their children's welfare and future safety. Unexpectedly, DeMaris and Swinford found that women who had sought help from shelters, lawyers, or therapists were more fearful than those who had not.[28] The threat of reprisal is real. Battered women who leave their partners may be hunted down, terrorized, abused or even killed.[29]

"Many battered women gradually accept a certain level of abuse to survive, but some will defend themselves to the extent of homicide. What drives these women?"

Symptoms of "Battering Fatigue"

Battered women develop psychological symptoms from the brainwashing process. The symptoms are similar to those of battle fatigue (shell shock). *The American Soldier*, a book about the US Army in World War II, states, "In combat, the individual soldier was rarely sure of what had just happened, what was going on at the moment, or what was likely to occur next . . . This kind of unceasing confusion-the lack of firm constants to which behavior could be oriented-exposed the individual to insidious anxieties."[30] A study of 5,000 soldiers in combat found that the constant fear of death led first to hyperarousal and then to exhaustion: "They became unable to distinguish friendly from enemy fire or to locate it. They became dull and listless . . . preoccupied, and had increasing difficulty in remembering details."[31] Importantly, the symptoms occurred in otherwise healthy soldiers, because unstable individuals had been excluded before combat.[31] Chronically battered women also fear for their lives, surviving one assault to await the next. They exhibit symptoms of fear and hyperactivity followed by exhaustion. The term "battering fatigue" describes this situation. Browne referred to the response in battered women as a "battle reaction" leading to severe passivity.[14] Hilberman and Munson found anxiety, insomnia, and suicidal feelings in their study of 60 battered women, and suggested "the women were a study in paralyzing terror." All had violent nightmares about someone or something trying to kill them. They were passive and unable to act independently.[32]

Hints of impending danger often increase a soldier's—or a woman's—feeling of terror and impair the ability to function.[10] A soldier, hearing a distant explosion, anticipates that the enemy will soon be near. A battered woman, hearing her abuser's footsteps, the rate of his speech, or the way he looks at her, is alert to potential danger. These stimuli are ever present, constantly reminding both soldiers and battered women of their vulnerable position.

Diagnostic Conceptualization

The stress symptoms of battering and battle fatigue are often associated with the diagnosis of Post Traumatic Stress Disorder (PTSD). However, PTSD usually describes the symptoms that occur in the aftermath of a traumatic event (a natural disaster, a witnessed murder, a near-fatal car crash, or even a prior abusive relationship). The stimuli for battering fatigue occur in the ongoing present, not the past. The more recent concept of Acute Stress Disorder (ASD) comes closer to the mark by encompassing stress symptoms, lasting from two days to four weeks, created by ongoing traumatic events. Still, the concept of ASD does not take into account the fact that the symptoms of battering are generated from a chronically stressful environment and last for longer periods of time. Perhaps it would be best to think of the symptoms of battering fatigue as a Chronic Stress Disorder.

The Price of Failing to Recognize Abuse

JP's husband would not allow her to speak to her friends or family although they lived only one mile away. He repeatedly beat her and forced her to have sex with his friends. He checked the mailbox for all outgoing and incoming mail, controlled the money, and knew where she was at all times. JP admitted to killing her husband, but had no memory of the event. She was sentenced to ten years in prison for the murder of her husband.

Without recognition and intervention, an extreme outcome of the battered woman syndrome is death of the victim or abuser. Besides the mental and physical morbidity of battering, over 4,000 abused women are killed yearly by their male partners,[33] and about 750 male abusers are killed each year by their female partners.[34] Only 12% of all homicides in the United States are committed by women—in most cases, women who killed violent partners.[35]

Many battered women gradually accept a certain level of abuse to survive, but some will defend themselves to the extent of homicide. What drives these women? Browne found that the difference between those who kill and those who do not relates to their degree of fear. Women who use violence are so fearful for their lives or those of their children that they kill in "self-defense."[14] In some instances, the act of self-defense does not actually occur during an assault. The abused woman may kill her abuser while he is sleeping or leaving the scene of attack. This is understandable in view of the woman's perception of imminent danger. In addition, because of the often disproportionate size and strength of the abuser, battered women may only be able to overcome the abuser when he is in a vulnerable position. Testimony about the psychological aspects of battering relationships has helped some battered women receive fair legal trials.

What Can We Do?

Abusers control their victims with a brainwashing process similar to that used on POWs, hostages and cult members. Like other "captives," battered women are isolated, confused, dependent, guilt-ridden, and scared for their lives. These women develop a variety of responses for coping with their situation. They also exhibit stress symptoms of "battering fatigue." Often these women are convinced that they have no way out of the their situation.

Some healthcare providers, when confronted with intimate partner violence, expect someone else - social workers, police officers, or lawyers - to take care of things. This means many cases of abuse remain undiscovered and unreported. Doctors are often the only ones in a position to recognize the physical symptoms (somatization) with which—instead of words—emotional pain is sometimes expressed in battered women. Thus doctors may be best able to make a difference in what happens to these women. Several screening tools can help identify individuals living in abusive relationships. One example is the "4 **HITS**" approach, which asks respondents how often their partner physically "**H**urt, **I**nsulted, **T**hreatened with harm or **S**creamed at them."[36] Screening questions may have to be repeated, perhaps many times, before a respondent will admit to abuse.

Understanding a battered woman's state of mind is crucial to helping her leave an abusive relationship. Because of brainwashing and battering fatigue, some women feel trapped. It is the responsibility of healthcare providers to diagnose the condition, contact the appropriate agencies, and work effectively with the legal system. Ultimately, the abused person needs emotional, economical, political, and societal support to maintain her safety. The first step toward this desired level of safety is to "decondition" the battered woman's experience. She needs to stop viewing the batterer as "all-powerful" and to strengthen her sense of independence.

Battered women also need help to recognize and recover from stress symptoms. In 1999, Arias and Pape studied the role of psychological abuse (as opposed to physical abuse) in determining battered women's intentions to terminate abusive relationships. Only victims with minimal PTSD (stress) symptoms were able to leave their abusive partners.[37] These findings support the idea that battering fatigue, with its paralyzing terror and emotional exhaustion, makes it difficult for women to leave abusive partners. It may help if we think of leaving as a process.[38] The woman needs first to envision life without her abuser and to prepare emotionally to separate. Curnow[39] and Landenberger[26] point out that leaving is most likely to occur after a woman has sought help for a battering episode. After becoming psychologically ready, the woman then needs a practical plan to ensure her safety so that she can seek long-term independence in the form of employment, housing, and support services.

It may take years for some women to leave an abusive situation. Therefore, health care providers must be patient and understanding when victims refuse to acknowledge the extent of the abuse and return to the abuser. Regardless of the strength of their denial or the outcome of our interventions, we should validate victims' feelings and offer choices. Our goal is to educate the abused person about her psychological condition while we treat her physical injuries. With respect, support and treatment, many battered women will ultimately be able to put their lives together and create healthy homes.

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How Good Medical Records Can Help Victims of Domestic Violence, Minimize Time in Court, and Maximize Effective Testimony

Nancy Barnhill Aycock, JD, Joan Herre Erwin, JD, and Gwyn Hilburn, JD

For centuries, medical practitioners dealt with the physical ravages of domestic violence but not the legal issues involved. Indeed, in the past, the law permitted "reasonable" wife beating and "correction" of other dependents because the husband was deemed responsible for the proper conduct of his family. Times have changed. Judith Smith Kaye, Chief Judge for the New York Court of Appeals, recently stated at Duke Law School, "We have finally reached the point where equal pay is a right, sexual harassment is a wrong, and domestic violence is a crime" (see Sidebar, next page). The changed legal response to domestic violence necessarily brings new responsibilities for health care professionals. Now, doctors not only must diagnose and treat the patient, they also must be prepared, if subpoenaed, to testify in court about the injuries treated or observed. The medical chart is not only a tool for treating disease, it has become an important piece of evidence in legal proceedings.

In this article we will address three aspects of the legal and medical issues created when a patient presents with admitted or suspected domestic abuse: (1) the medical record—specifically, why and how to chart; (2) use of the medical chart in court; and (3) the subpoena.

The Medical Record

A medical record is created and maintained in hospitals, clinics, or doctors' offices. It consists of a written record containing "sufficient information to identify the patient, support the diagnosis, justify the treatment, document the course and results, and promote uniformity of care among health care providers."[1] The record should be complete, accurate, and confidential; it should relate the patient's history and provide documentation to assist in patient care; it should support the testimony of witnesses in court. A medical record, either handwritten or electronic, should contain, without limitation, a record of doctors' clinical observations, conclusions, or impressions drawn from admission history and physical examinations; photographs; results of tests; diagrams; radiographs; nurses' notes; diagnostic or therapeutic orders; progress notes; names of others providing medical consultative services; final diagnosis(es); and discharge instructions. The medical record itself is the property of the hospital, clinic, or doctor, but patients generally have a right to inspect and request copies of the medical record, and a right to expect that the record will remain confidential.

All medical records should be permanent records, containing legible entries that have not been altered, that have been prepared in a timely and thorough manner, and that contain only truthful, factual information. The medical record should never contain intentionally false entries and should avoid speculation. Late entries should be avoided if possible, but should always be signed, dated, and indicated as late entries with an explanation of necessity. If a chart must be corrected, the corrections should be signed, dated, and timed. Incorrect information should be lined through with a single line, signed, dated and timed. Never use correction fluid to cover or erase an entry. The incorrect entry should be clearly legible through the single line.

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The reliability of a medical record rests on the assumption that it is accurate to the best of the recorders' ability, and represents their first-hand observations. The same care that ensures that a colleague may use a chart with confidence to treat a patient ensures that the chart is a trustworthy item of evidence in a legal proceeding.

Why To Chart: Good charting not only ensures diagnosis, treatment, and continuity of care, but also provides a clear, accurate, and comprehensive compilation of clinical data recorded at the time the patient was treated. Such data have "indicia of reliability", that is, credibility, in a court setting because they are compiled in the ordinary course of the doctor's business. More importantly, such a record is deemed reliable because the fact-finder (judge or jury) understands the general principle that humans are most likely to tell the truth when it is in their best interest to do so or when they are least in control of themselves. This means that all of us are likely to tell the truth when we are seeking accurate medical advice or treatment or when we are so traumatized that we are unable to reflect sufficiently to lie about an episode. When a patient comes to the emergency department or a doctor's office seeking help for severe physical injuries, these principles tend to converge. The doctor recording this information creates a record for trial—a snapshot in time of the victim's physical and mental condition.

How to Chart: Good documentation is the key both to good patient care and to a good experience in the legal system. Suggestions for good charting include the following:

- Write legibly, in ink, using only accepted abbreviations. Place the patient's full name and number on each page. Sign and date each entry.
- Write in the active voice and present tense ("The patient presents with the following injuries: bruises and scratches about the neck and face, five scratches, four bruises" rather than "The patient was bruised.")
- Record observations, not your speculations about the observations ("The bruises and scratches were in various stages of healing. There was dried blood on the neck" rather than "Patient appeared to have been beaten on several different occasions")
- Describe the injuries according to type, size, and location. Remember that in cases of domestic violence (or indeed, any criminal trauma situation), the patient's body is not only something to be healed, but also a crime scene.
- Record the patient's history in detail. A good method states a question and the patient's responses. Use the patient's own words, and use quotation marks to clarify which words are yours and which the patient's. (Q: "Who did this to you?" A: "My baby's daddy." Q: "What's his name?" A: "Johnny Jones.") Be careful to record information related to you about how and where the injuries occurred, as well as any history of violence between the patient and the perpetrator.

In North Carolina, domestic violence can result in criminal charges or civil actions for emergency relief or protection. *North Carolina General Statute §50B-1* defines domestic violence as follows:

(a) Domestic violence means the commission of one or more of the following acts upon an aggrieved party or upon a minor child residing with or in the custody of the aggrieved party by a person with whom the aggrieved party has or has had a personal relationship, but does not include acts of self-defense:

1. Attempting to cause bodily injury or unintentionally causing bodily injury; or
2. Placing the aggrieved party or a member of the aggrieved party's family or household in fear of imminent serious bodily injury; or
3. Committing any act defined in G.S. 14-27.2 through G.S. 14-27.7.

(b) For purposes of this section, the term "personal relationship" means a relationship wherein the parties involved:

1. Are current or former spouses;
2. Are persons of the opposite sex who live together or have lived together;
3. Are related as parents and children, including others acting in loco parentis to a minor child, or as grandparents and grandchildren. For purposes of this subdivision, an aggrieved party may not obtain an order of protection against a child or grandchild under the age of 16;
4. Have a child in common;
5. Are current or former household members;
6. Are persons of the opposite sex who are in a dating relationship or have been in a dating relationship. For purposes of this subdivision, a dating relationship is one wherein the parties are romantically involved over time and on a continuous basis during the course of the relationship. A casual acquaintance or ordinary fraternization between persons in a business or social context is not a dating relationship.

Criminal charges are divided into two broad categories, felonies and misdemeanors. Felonies are more serious crimes, generally punishable by a term of imprisonment of more than five months up to and including death. Any crime not a felony is a misdemeanor. Felonies are tried in Superior Court before a judge and jury. Misdemeanors are tried initially in the District Court before a judge, with a trial *de novo* in Superior Court upon appeal.

Domestic violence often leads to criminal charges including, but not limited to, misdemeanor assault, batteries, or affrays; assault inflicting serious injury; assault by pointing a gun; felony assaults (assault with a deadly weapon with intent to kill, inflicting serious injury, assault with a deadly weapon inflicting serious injury, etc.); communicating threats; trespass; kidnapping or abduction; burglary, breaking and entering; stalking; rape and other sexual offenses; murder; and manslaughter. Domestic violence may also result in civil actions such as restraining orders for the protection of the alleged victim.

- If any detected injuries seem inconsistent with the history reported by the patient, this should be explored further. If the patient persists, document the patient's statement as well as your opinion, based on the injuries you see. ("Patient states gash received from falling off of her bed onto the floor; injury appears inconsistent with this history, but is consistent with infliction by a sharp instrument.") The person you are seeing may well be the defendant in an upcoming case and may be trying to "set up" a defense. Clarifying your records about any apparent inconsistency between statement and wound could prevent you from being used in the creation of such a defense.
- Photograph the injuries and attach the photographs to the medical record. These will show the seriousness of injuries and will corroborate any future testimony about what was observed. Take several photographs close up, including one of the face of the patient so there can be no doubt, if the case comes to court, that the photographs are those of the individual in question. To add perspective, place a ruler or a coin in the picture. Always write your name, the date, and the name of the subject on each photograph. If you do not take the photographs yourself, make certain you document in the medical record that the photographs were taken in your presence and by whom they were taken.
- Use diagrams, especially if bruises or other injuries such as bite marks are so faded that they will not show distinctly in a photograph. An injury location chart or your own drawing is sufficient.

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- Document the chain of custody if you collect physical evidence or observe physical evidence being collected in your presence. You might state, "Handed [bullet, clothing, broken eye glasses, rape kit] to [police officer (name), nurse (name), etc.] with instructions to seal in a paper bag." Preservation of physical evidence may provide crucial corroboration of the patient's version of what happened. Sometimes the fact-finder does not know whether to believe the purported victim or the defendant. Items of physical evidence such as torn clothing, bloody towels, broken jewelry, or hair comparisons may be the key to finding the truth about the case. Items of physical evidence, especially when tested, must be kept in a chain of custody to ensure that the evidence is not altered.
- Document the emotional state of the patient in the active tense and objectively: "Patient is sobbing and says she is 'afraid Johnny will cut her up again.'" Do not say, "Patient is upset and fearful of further injury."
- Do not interview the patient in the presence of the suspected abuser. The less inherently coercive the situation, the more likely the patient will be to speak candidly.

The Use of the Medical Chart in Court

A medical record must satisfy five criteria to be used as evidence in court. The custodian of the records must testify to the following: (1) that the record is that of the patient in question, (2) that the record was compiled in the ordinary course of business, (3) that the record was made at the time the events cited in the record occurred, (4) that the record was made by a person or persons who had knowledge of the events recorded, and (5) that the record was made before the litigation began. A chart that fulfills these requirements is, under North Carolina law, admissible in evidence as a business record.[2] This means that the medical record itself is admissible without the testimony of the attending doctor. Unfortunately, having the record ordinarily will not exempt a doctor from testifying, but a well-documented chart will, in some circumstances, convince a defendant that the best course of action is to plea-bargain, thus avoiding a trial. Conversely, a poorly documented chart could cause a prosecutor to decide not to take a case to trial. Sometimes the lawyers will stipulate what the doctor's testimony would be, based on the chart, especially when the chart is clear and cogent. In these situations, the doctor will not have to testify in court. However, in most situations the medical chart serves as an aid to a doctor's testimony, but not in lieu of such testimony.

The doctor generally is a vital witness in trials involving domestic violence or any trial in which medical evidence is relevant. The doctor is the one person who can provide the fact-finder with credible and neutral testimony about physical trauma, and expert opinion about the cause, extent and seriousness of any injuries noted. Most fact-finders respect doctors both for their chosen profession as healer and for the knowledge and intelligence needed to become a doctor. Thus, it is rare that a competent prosecutor will forego putting a doctor on the stand to explain medical observations even when the chart is independently admissible.

No one enjoys being a witness, especially under cross-examination. As one law professor put it, being a witness is equivalent to standing against a wall and having darts thrown at you. And many of the persons throwing those darts believe that, but for a bad grade or two in P-Chem or Biology 101, they would have been doctors instead of lawyers. Still, the time on the witness stand will be less painful and shorter when the medical chart has been carefully documented.

Of first and utmost importance, remember that a valid waiver of confidentiality—by the patient, by statute (as when reporting child abuse or gunshot wounds) or by a valid court order issued by a judge—is necessary before testifying about the contents of the medical record, before using the record for any purpose in court, or before speaking to a lawyer or investigator in preparation for court. Even after confidentiality has been waived, the doctor has the right to determine whether or not to speak to lawyers or investigators for either the State or the defense before trial of a criminal case. When in doubt about any aspect of the case, the doctor should consult his own counsel. Premature discussion of the medical file will not affect its admissibility as evidence,[3] but it may affect the doctor's license if a breach of confidentiality complaint is filed with the Medical Board.

The medical chart and the doctor's testimony can be used in a number of ways if the proper foundation for admissibility is present. The doctor can use the record to refresh his recollection on the matters which he recorded but cannot independently recall in court without assistance of the chart.[4] It can be introduced in lieu of the doctor's testimony if the doctor has no independent recollection of the matters recorded in the medical chart.[5] It can be used to corroborate or impeach statements of the victim or defendant at trial if the defendant or victim made a pertinent statement during the course of treatment.[6] In some cases, the statements of a victim recorded in the chart can be introduced even if the victim is unavailable to testify.[7-9] The chart may be used by other doctors as the basis for expert opinions on matters relating to the trial, such as whether the victim suffered from post-traumatic stress disorder, or whether the defendant had the necessary level of specific intent to commit the crime of which he stands accused.[10] Relevant photographs, diagrams, or x-rays may be introduced to illustrate the testimony of the witness or, in some cases, as independent substantive evidence.[11,12]

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As we noted earlier, actual statements made by the victim or defendant during treatment should be recorded in the medical chart since why they were hurt, how they were hurt, and who hurt them is pertinent to the diagnosis or treatment of their injuries. In some circumstances, the doctor is able to testify about statements made by the patient as well as about any injuries observed and treated. Such testimony is an exception to the rule against hearsay, so the doctor must present a foundation for the reliability of this information. In most circumstances, the rules of evidence forbid the use of "hearsay" (statements made by someone other than the witness). The two building blocks for the admission of evidence in our legal system are that the evidence must be reliable and that the adverse party must have the opportunity to test the information by cross-examination. Obviously, when the declarant is not a witness, the statement cannot be cross-examined for bias, mistake, or other matters that might suggest to the fact-finder that the statement is untruthful. In certain circumstances, courts do permit hearsay statements into evidence: if the statements were made under conditions that would render them reliable, and if the failure to introduce the evidence would work an injustice. Classic examples include dying declarations; business records; excited utterances; statements made for the purpose of diagnosis or treatment; recorded recollection; statements of then-existing mental, emotional, or physical conditions; records of vital statistics; and statements against penal interest such as a confession.[13] Because of the nature of their work as healers and attendants at the time of death, doctors and nurses are often the persons who hear and record these statements.

Since hearsay evidence precludes the requirement for cross examination of the declarant, careful foundations must be laid to show that the statements were made under conditions that would render them reliable before a doctor may testify concerning these matters. The court must be certain that medical notes contain information sufficient to lay the necessary evidentiary foundation when a doctor is called upon in court to testify about the statements.

A declaration by a dying patient that a specific person inflicted (or did not inflict) a fatal wound may be admitted into evidence only if it meets a two part test: (1) that the victim believed that he or she was at the point of death and unlikely to recover, and (2) that the victim later died.[14,15] The best evidence of the first prong of the test is an express statement to that effect by the patient. A notation in the medical chart that the victim believed that she was going to die and why she held that belief would help lay the foundation for admissibility of the declaration.[16]

A statement given for purposes of medical diagnosis or treatment is admissible as an exception to the hearsay rule only when it is clearly established that (1) the patient intended to make the statement at issue in order to obtain a medical treatment or diagnosis, and (2) the statement was reasonably pertinent to diagnosis or treatment. The patient's intentions are drawn from the objective circumstances of the record.[17] A statement of why the patient presented to the doctor can be of utmost importance in establishing that the victim sought treatment, not to supply favorable evidence for court. Pre-trial statements made by a victim or defendant to a doctor who is to serve as an expert witness are not admissible as exceptions to the hearsay rule since, clearly, the indicia of reliability is no longer present. The victim or defendant is preparing for court, not for medical treatment.[18]

The rule of past recollection recorded [North Carolina General Statute (NCGS) §8C-1, Rule 803(5)] permits introduction of certain written evidence when the memory of the person who wrote or adopted the statement has faded and cannot be refreshed by reviewing the statement. Most doctors, especially family practitioners, will recall their patient's injuries and treatment when they review a well-documented medical record. But in large emergency departments doctors see thousands of patients and may not remember anything about the circumstances of treatment when the case comes to trial a year or so later. In such cases, the record will be introduced into evidence in lieu of the doctor's testimony as long as the doctor can state that, while he or she no longer recalls the information, the medical record was (1) made or adopted by the testifying doctor at a time when he or she recalled the events, and (2) accurate at the time it was written down.

Medical records can be introduced under the business record exception to the hearsay rule so long as the custodian of the records states that the records were under his custody and control, were made in the regular course of business, were made at or near the time of the act or event recorded, and were made by persons having personal knowledge of the information recorded.[19,20]

An expert witness may use the medical records to form opinion on a diagnosis. The expert may then testify concerning how he reached his decision and, in doing so, may quote from the record or have it introduced through him. An opponent may cross-examine the expert who used the records to form an opinion.[21]

In general, a doctor introducing photographs or diagrams into evidence must state that they illustrate his or her testimony about observations of the victim or defendant, or the injuries or the extent of injuries. In other words, photographs serve as aids to the testimony of the doctor, not as freestanding evidence.[22,23] But since 1981 photographs, videotapes, x-rays or other such visual representations may be introduced independently as substantive evidence, whether or not a witness can say that the photograph or x-ray illustrated his testimony. When used in this way, the important issues are whether the visual depiction is relevant, whether the apparatus that created the image was working properly, and whether the chain of custody for the visual exhibit was maintained—in other words, whether the visual representation has been authenticated.

The properly documented medical record is a valuable asset to the truth-finding function of a trial. It can help a doctor testifying about the victim's condition and injuries by providing a documentary record of treatment. A doctor's primary duty must always be the care of the patient, but attention to charting will assist in the legal proceedings that often follow.

The Subpoena

Doctors may receive a subpoena to produce the medical file and testify in court about a patient's injuries. Most of the cases are tried in the state court system on criminal charges of assault, rape, or murder. Subpoenas are likely to be issued by the District Attorney's office on behalf of the patient, but some are issued by defense counsel in a criminal case or by either party in a civil case, especially in child custody or divorce actions.

Rule 45 of the Rules of Civil Procedure governs the manner by which subpoenas may be issued and served to require the attendance of witnesses and the production of documentary evidence. Rule 45 and related rules outline valid methods of serving subpoenas and the punishment for failure to obey. Subpoenas may be issued for testimony only, or for both medical charts and testimony in court or in pretrial depositions. Normally, subpoenas are served in person by the sheriff or a deputy, but they may be served by the coroner or any person not less than 18 years old who is not a party to the legal proceeding. Delivery in person or by certified or registered mail is the only appropriate method of service for the production of documentary evidence. Service of a subpoena by telephone suffices when the subpoena is for testimony only.[24] The most important thing is that, even if service seems less than authentic because of how, when, or by whom served, a judge will consider that the doctor is on notice for his presence in court. If you have doubts about the validity of service, call appropriate counsel. Just as lawyers cannot take out tonsils, doctors should not try to practice law. A doctor should not place his reputation or personal freedom in jeopardy by failing to respond to a subpoena, no matter how exasperating the circumstances.

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There are several things to remember if you receive a subpoena:

DO: Take the subpoena seriously. You can and will be held in contempt if you do not appear as directed. The judge is permitted by law to order you brought before him and then summarily placed in jail without a trial if you disobey a court order such as a subpoena.

DO: Call for appropriate legal assistance. Ask the party who subpoenaed you to permit you to be on telephone standby or to arrange a time certain for you to come to court. If the District Attorney subpoenas you or your medical chart or both, contact the witness coordinator for the District Attorney's office (Appendix) so that you will not have to spend time just sitting in court.

DO: Review the subpoena to determine who subpoenaed you. If you receive telephone service rather than personal or mail service, request that the document itself be faxed or delivered to you.

DO: If someone other than the District Attorney subpoenaed you, call that party's counsel and request an accommodation regarding when you must appear to testify and whether you may be on telephone stand-by. Even if you receive no cooperation, do not ignore the subpoena. Request assistance from the district attorney or ask your own lawyer or the hospital's legal counsel to help you.

DO: If you are on staff at a hospital or have legal counsel for your clinic, contact that counsel as soon as you receive a subpoena. If you do not have in-house counsel, seek your own legal counsel regarding questions about the subpoena.

DO NOT: Talk to anyone other than your patient about the patient's situation or about the contents of the medical chart. This includes the District Attorney or the police, except when you have written authorization or release from your patient, statutory authority waiving the privilege in a particular circumstance, or a valid court order requiring the release of information. Unless signed by a judge, a subpoena does not require that you to talk to or turn your file over to anyone. Do not yield to pressure to send a medical record to anyone or discuss its contents without patient authorization, statutory authority, or a valid court order. This includes the patient's own lawyer.

DO NOT: Release the medical record without patient authorization unless ordered to by the judge in open court, by a judge-signed subpoena, by a written court order signed by a judge, in response to a search warrant, or pursuant to a statutory requirement.

DO NOT: Underestimate the wrath of a judge if you do not appear as directed by a subpoena or if you fail to bring the required documents. As noted earlier, judges have contempt power and they will use it to enforce the authority of the subpoena.

The preceding list of "Dos and Don'ts" should limit administrative problems, limit any ethical concerns, and cut down on the time you must sit in court waiting to testify. Just remember subpoenas are like taxes, unpleasant but something you ignore at your peril.

Conclusion

In order to best serve the patient's interests in cases of suspected domestic violence, doctors must keep a proper medical chart, looking not only to the present medical situation but also to the eventuality of future legal proceedings. Armed with a properly documented medical chart, the doctor can, with confidence, negotiate the unfamiliar waters of the legal system.

References

1 JCAHO, 2000 Comprehensive Accreditation Manual for Hospitals, IM.7.2
2 North Carolina General Statute (NCGS) §8-44.1: 8C-1, Rule 803(6).
3 State v. Fullwood, 323 NC 371, 373 SE 2d 518 (1988).
4 Present Recollection Refreshed. NCGS § 8C-1, Rule 612
5 Past Recollection Recorded. NCGS § 8C-1, Rule 803(5).
6 Prior Statements of Witnesses. NCGS § 8C-1, Rule 613
7 Dying Declaration. NCGS. § 8C-1, Rule 804 (1)
8 NCGS § 8-51.1
9 Statement of Medical Condition, Excited Utterances, Past Recollection Recorded, Business Records, Statements for Purpose of Medical Treatment or Diagnosis. NCGS § 8C-1, Rules 803, 804
10 NCGS § 8C-1, Rule 701, et seq.
11 NCGS §8-97
12 NCGS §8C-1, Rule 1001).
13 NCGS § 8C-1, Rules 803 (1-9) and 804
14 NCGS § 8C-1, Rule 804(2)
15 NCGS § 8-51.1.
16 State v. Stevens, 295 NC 21, 243 S.E.2d 771 (1978)
17 State v. Hinnant, 351 NC 277, 523 S.E.2d 663 (2000)
18 State v. Stafford, 317 NC 568, 346 S.E.2d 463 (1986)
19 NCGS § 8-44.1
20 NCGS § 8C-1, Rule 803(6)
21 NCGS § 8C-1, Rule 703
22 NCGS § 8-97
23 NCGS § 8C-1, Rule 1001 et seq.
24 NCGS §1A-1, Rule 45(e)

Appendix 2. Directory of North Carolina prosecutors and staff

District	Counties	District Attorney	Phone number for witness coordinator	Domestic violence coordinator
1	Camden, Chowan, Currituck, Dare, Gates, Pasquotank, Perquimans	Frank R. Parrish	(252)331-4743	
2	Beaufort, Hyde, Martin, Tyrell, Washington	Mitchell D. Norton	(252)946-0141	
3A	Pitt	W. Clark Everett	(252)695-7200	Deborah J. Battle (252)695-7207
3B	Carteret, Craven, Pamlico	David McFayden, Jr.	(252)514-4703	
4	Duplin, Jones, Onslow, Sampson	G. Dewey Hudson, Jr.	(910)455-8008	
5	New Hanover, Pender	John E. Carriker	(910)341-4510	Charles Bost Charles Chapman (910)772-7814
6A	Halifax	W. Robert Caudle II	(252)583-4801	
6B	Bertie, Hertford, Northampton	David H. Beard, Jr.	(252)398-5771	
7	Edgecombe, Nash, Wilson	Howard S. Boney, Jr.	(252)823-7350	
8	Greene, Lenoir, Wayne	Branny Vickory	(252)731-7913	
9	Franklin, Granville, Vance, Warren	David R. Waters	(919)693-5773	
9A	Caswell, Person	Joel H. Brewer	(336)597-0562	
10	Wake	Colon Willoughby, Jr.	(919)835-3353	Heidi M. Betts Marianne Wellen (919)835-3347
11	Johnston, Harnett, Lee	Thomas H. Lock	(919)934-3071	Melissa Godwin Anne Lucas Melody Price (919)934-3071
12	Cumberland	Edward W. Grannis, Jr.	(910)678-2915	
13	Bladen, Brunswick, Columbus	Rex Gore	(910)253-4447	
14	Durham	James E. Hardin, Jr.	(919)560-6044	
15A	Alamance	Robert F. Johnson	(336)570-6876	Lori Wickline (336)570-6876
15B	Chatham, Orange	Carl R. Fox	(919)732-9334	
16A	Hoke, Scotland	Jean E. Powell	(910)875-9632	
16B	Robeson	Luther Johnson Britt III	(910)671-3300	
17A	Rockingham	Belinda J. Foster	(336)342-8760	
17B	Stokes, Surry	C. Ricky Bowman	(336)386-8178	
18	Guilford	Horace M. (Jim) Kimel	(336)574-4313	
19A	Cabarrus	Mark Speas	(704)786-6171	
19B	Randolph, Montgomery, Moore	Garland N. Yates	(336)318-6890	
19C	Rowan	William D. Kenerly	(704)639-7512	
20	Anson, Richmond, Stanly, Union	Kenneth W. Honeycutt	(704)289-3340	Debra A. Smith (704)289-3340
21	Forsyth	Thomas J. Keith	(336)761-2214	
22	Alexander, Davidson, Davie, Iredell	Garry Frank	(336)249-0373	
23	Alleghany, Ashe, Wilkes, Yadkin	Tom Horner	(336)667-6361	
24	Avery, Madison, Mitchell, Watauga, Yancey	James T. (Tom) Rusher	(828)265-5405	
25	Burke, Caldwell, Catawba	David T. Flaherty, Jr.	(828)757-1364	
26	Mecklenburg	Peter S. Gilchrist, III	(704)347-7891	
27A	Gaston	Michael K. Lands	(704)852-3113	
27B	Cleveland, Lincoln	William C. Young	(704)484-4872	
28	Buncombe	Ronald L. Moore	(828)232-2500	
29	Henderson, McDowell, Polk, Rutherford, Transylvania	Jeff Hunt	(828)697-4882	
30	Cherokee, Clay, Graham, Haywood, Jackson, Macon, Swain	Charles W. Hipps	(828)456-3067	

N.C. COUNCIL FOR WOMEN
DOMESTIC VIOLENCE & SEXUAL ASSAULT

STATE-FUNDED PROGRAMS
JULY 1, 2000 – JUNE 30, 2001

http://www.doa.state.nc.us/doa/cfw/cfw.htm

DV=Domestic Violence Program **SA**=Sexual Assault Program **DV/SA**=Program serves DV & SA

*New DV Programs **New SA Programs

ALAMANCE COUNTY (DV)
FAMILY ABUSE SERVICES OF
ALAMANCE COUNTY, INC.
PO Box 2192
142 S. Lexington Avenue
Burlington, NC 27216
Office Phone: (336) 226-5982
Fax Number: (336) 226-0536
Crisis Phone: (336) 226-5985
Contact: Jenna Johnson

ALAMANCE COUNTY (SA)
CROSSROADS
PO Box 673
Burlington, NC 27217
Office Phone: (336) 228-0813
Fax Number: (336) 228-7087
Crisis Phone: (336) 228-0360
Contact: Brenda Sawyer

**ALEXANDER COUNTY (DV)*
service provided through Wilkes County
DOMESTIC VIOLENCE RESOURCE
CENTER
PO Box 652
Taylorsville, NC 28681
Office Phone: (828) 635-8850
Fax Number:
Crisis Phone:
Contact: Michelle Cole

**ALLEGHANY COUNTY (DV)*
ALLEGHANY PARTNERSHIP FOR
CHILDREN
PO Box 1643
451 N. Main Street
Sparta, NC 28675
Office Phone: (336) 372-2846
Fax Number: (336) 372-7705
Crisis Phone: (828) 262-5035*
(SA) (800) 268-1488*
Contact: Bob Bamberg
*(*Crisis numbers are to Oasis in Watauga County)*

**ANSON COUNTY (DV)*
ANSON DOMESTIC VIOLENCE
COALITION
148-C E. Morgan Street
Wadesboro, NC 28170
Office Phone: (704) 694-4499
Fax Number: (704) 694-4515
Crisis Phone: (704) 694-4499
Contact: Mechell Turner

ASHE COUNTY
see Watauga County

AVERY COUNTY (DV)
ACADA HOME, INC.
PO Box 1645
Newland, NC 28657
Office Phone: (828) 733-3512
Fax Number: (828) 733-7319
Crisis Phone: (828) 733-3512
Contact: Susie Smith

BEAUFORT COUNTY (DV/SA)
serves Washington, Martin, Hyde & Tyrrell Counties
OPTIONS TO DOMESTIC
VIOLENCE & SEXUAL ASSAULT,
INC.
PO Box 1387
Washington, NC 27889
Office Phone: (252) 946-3219
Fax Number: (252) 946-9678
Crisis Phone: (252) 946-3219
(877) 723-8390
Contact: Tiffany Baker

**BERTIE COUNTY (DV)*
service provided through Hertford County
ROANOKE-CHOWAN S.A.F.E.
PO Box 98
Ahoskie, NC 27910
Office Phone: (252) 332-1933
(252) 332-4047
Fax Number: (252) 332-2450
Crisis Phone: (252) 332-1933
Contact: Connie Piland

**BLADEN COUNTY (DV)*
service provided through Columbus County
FAMILIES FIRST, INC.
PO Box 1776
Whiteville, NC 28472
Office Phone: (910) 642-5996
Fax Number: (910) 641-0253
Crisis Phone: (910) 641-0444
Contact: Vickie Pate
service also provided by Robeson County
SOUTHEASTERN FAMILY VIOLENCE
CENTER
PO Box 642
Lumberton, NC 28359-0642
Office Phone: (910) 739-8622
Fax Number: (910) 739-1180
Crisis Phone: (910) 739-8622
Contact: Debra Fowler

BRUNSWICK COUNTY (DV/SA)
HOPE HARBOR HOME, INC.
PO Box 230
1053 Old Ocean Hwy. 17 S.
Supply, NC 28462
Office Phone: (910) 754-5726
Fax Number: (910) 754-9049
Crisis Phone: (910) 754-5856
Contact: Cathy Swaim

BUNCOMBE COUNTY (DV)
HELPMATE, INC.
56 College Street, Suite 201 Asheville, NC
28801
Office Phone: (828) 254-2968
Fax Number: (828) 254-0720
Crisis Phone: (828) 254-0516
Contact: Sharon Robbins

BUNCOMBE COUNTY (SA)
OUR VOICE
BUNCOMBE COUNTY
PO Box 7453
Asheville, NC 28802

Office Phone: (828) 252-0562
Fax Number: (828) 252-8601
Crisis Phone: (828) 255-7576
Contact: Cynthia Shaffer

BURKE COUNTY (DV/SA)
OPTIONS, INC.
PO Box 2512
Morganton, NC 28680
Office Phone: (828) 438-9444
Fax Number: (828) 437-0323
Crisis Phone: (828) 438-9444
Contact: Elaine Propst

***CABARRUS COUNTY (DV/SA)*
CABARRUS VICTIM'S
ASSISTANCE NETWORK
PO Box 1749
Concord, NC 28026

Office Phone: (704) 788-1108
Fax Number: (704) 788-1109
call prior to faxing
Crisis No: (704) 788-2826
Contact: Mary M. Flynn

CALDWELL COUNTY (DV/SA)
SHELTER HOME OF CALDWELL
COUNTY, INC.
515 Scroggs Street
Lenoir, NC 28645
Office Phone: (828) 758-0888
Fax Number: (828) 758-8949
Crisis Phone: (828) 758-0888
Contact: Terri Looper

CAMDEN COUNTY
see Pasquotank County

CARTERET COUNTY (DV)
CARTERET COUNTY DOMESTIC
VIOLENCE PROGRAM, INC.
PO Box 2279
Morehead City, NC 28557
Office Phone: (252) 726-2336
Fax Number: (252) 726-8996
Crisis Phone: (252) 728-3788
Contact: Glenda Riggs

CARTERET COUNTY (SA)
CARTERET COUNTY RAPE
CRISIS PROGRAM
313 Turner Street
Beaufort, NC 28516

Office Phone: (252) 504-3668
Fax Number: (252) 504-3768
Crisis Phone: (252) 247-3023
Contact: Jane Harvey

CASWELL COUNTY (DV)
CASWELL COUNTY PARISH,
INC.
PO Drawer F
1038 Main Street
Yanceyville, NC 27379
Office Phone: (336) 694-6428
Fax Number: (336) 694-9276
Crisis Phone: (336) 694-5655
Contact: Lisa Lipscomb

CATAWBA COUNTY (DV)
FAMILY GUIDANCE CENTER,
INC.
17 Hwy. 70, SE
Hickory, NC 28602
Office Phone: (828) 322-1400
Fax Number: (828) 324-8682
Crisis Phone: (828) 322-1400
Contact: Sherry Barnes

CATAWBA COUNTY (SA)
serves Alexander County
RAPE CRISIS CENTER
260 1st Avenue NW, Suite 228
Hickory, NC 28601
Office Phone: (828) 322-6011
Fax Number: (828) 322-1704
Crisis Phone: (828) 322-6011
Contact: Bettye Clark

CHATHAM COUNTY (DV/SA)
FAMILY VIOLENCE & RAPE CRISIS
SERVICES
PO Box 1105
Pittsboro, NC 27312
Office Phone: (919) 542-5445
Fax Number: (919) 542-6414
Crisis Phone: (919) 542-4422
Contact: Jo Sanders

CHEROKEE COUNTY (DV/SA)
serves Clay County
TASK FORCE ON FAMILY VIOLENCE,
REACH, INC.
PO Box 977
Murphy, NC 28906
Office Phone: (828) 837-8064
Fax Number: (828) 837-2097
Crisis Phone: (828) 837-8064
Contact: Robin Mauney

CHOWAN COUNTY
See Hertford and Pasquotank Counties

**CLAY COUNTY (DV)*
service provided through Cherokee County
REACH OF CLAY COUNTY
PO Box 1485
Hayesville, NC 28904
Office Phone: (828) 389-0797
Fax Number: (828) 389-0797
call prior to faxing
Crisis Phone: (828) 389-0797
Contact: Vicky Taylor

CLEVELAND COUNTY (DV/SA)
serves Cherokee County, SC
CLEVELAND COUNTY ABUSE PREVENTION COUNCIL, INC.
PO Box 2589
Shelby, NC 28151
Office Phone: (704) 487-9325
Fax Number: (704) 487-9314
Crisis Phone: (704) 481-0043
Contact: Millie Hershenson

***COLUMBUS COUNTY (DV/SA)*
serves Bladen County
FAMILIES FIRST, INC.
PO Box 1776
Whiteville, NC 28472
Office Phone: (910) 642-5996
Fax Number: (910) 641-0253
Crisis Phone: (910) 641-0444
Contact: Vickie Pate

CRAVEN COUNTY (DV)
serves Jones & Pamlico Counties
COASTAL WOMEN'S SHELTER
PO Box 13081
1333 S. Glenburnie Road
New Bern, NC 28561
Office Phone: (252) 638-4509
Fax Number: (252) 638-1298
Crisis Phone: (252) 638-5995
Contact: Joan Cantor

CRAVEN COUNTY (SA)
CRAVEN COUNTY COUNCIL ON WOMEN, INC.
PO Box 1285
1401 Park Avenue, 28560
New Bern, NC 28536-1285
Office Phone: (252) 636-3381
Fax Number: (252) 636-2278
Crisis Phone: (252) 638-5995
Contact: Jennifer Schultz

CUMBERLAND COUNTY (DV)
serves Ft. Bragg & Pope AFB
CARE (Cumberland County Dept. of Social Services)
PO Box 2429
Fayetteville, NC 28302
Office Phone: (910) 323-4187
Fax Number: (910) 677-2661
Crisis Phone: (910) 323-4187
Contact: Crystal Black

CUMBERLAND COUNTY (SA)
RAPE CRISIS VOLUNTEERS OF CUMBERLAND COUNTY
1327 Morganton Road
Fayetteville, NC 28303
Office Phone: (910) 485-7273
Fax Number: (910) 485-1365
Crisis Phone: (910) 485-7273
Contact: Aurelia Sands-Belle

**CURRITUCK COUNTY (DV)*
service provided through Pasquotank County
ALBEMARLE HOPELINE
PO Box 2064
Elizabeth City, NC 27906-2064
Office Phone: (252) 338-5338
Fax Number: (252) 338-2952
Crisis Phone: (252) 338-3011
Contact: Patricia Youngblood

DARE COUNTY (DV/SA)
OUTER BANKS HOTLINE, INC.
PO Box 1417
Manteo, NC 27954
Office Phone: (252) 473-5121
Fax Number: (252) 473-9895
Crisis Phone: (252) 473-3366
Contact: Lynn Bryant

DAVIDSON COUNTY (DV/SA)
FAMILY SERVICES OF DAVIDSON COUNTY, INC.
PO Box 607
Lexington, NC 27293
Office Phone: (336) 249-0237
Fax Number: (336) 243-7685
Crisis Phone: (336) 243-1934
Contact: Glynis Wikstrom

DAVIE COUNTY (DV)
DAVIE DOMESTIC VIOLENCE SERVICES
180 South Main Street, Suite 115
Mocksville, NC 27028
Office Phone: (336) 751-3450
Fax Number: (336) 751-3451
Crisis Phone: (336) 751-4357
Contact: Martha McQueen

***DUPLIN COUNTY (DV/SA)*
SARAH'S REFUGE, INC.
PO Box 368
121 West College Street
Warsaw, NC 28398
Office Phone: (910) 293-3467
Fax Number: (910) 293-3973
Crisis Phone: (910) 293-3973
Contact: Patricia Peterson

DURHAM COUNTY (DV)
ORANGE/DURHAM COALITION FOR BATTERED WOMEN
PO Box 688
Durham, NC 27702
Office Phone: (919) 688-4015
Fax Number: (919) 403-7075
Crisis Phone: (919) 688-2372
Contact: Ada Gregory

DURHAM COUNTY (SA)
serves Person, Vance & Granville Counties
RAPE CRISIS OF DURHAM
PO Box 52028
1703 Chapel Hill Road
Durham, NC 27717
Office Phone: (919) 419-7055
Fax Number: (919) 490-9726
Crisis Phone: (919) 401-9295
Contact: Terri Allred

EDGECOMBE COUNTY (DV/SA)
serves Nash County
EXECUTIVE OFFICE
MY SISTER'S HOUSE, INC.
PO Box 7665
Rocky Mount, NC 27804-0665
Office Phone: (252) 977-2892
Fax Number: (252) 977-9459
Crisis Phone: (252) 446-2400
Contact: Meredith Holland
SATELLITE OFFICE
MY SISTER'S HOUSE
217 Main Street
Port of Tarboro
Tarboro, NC 27886
Office Phone: (252) 823-7057
Fax Number:
Crisis Phone: (252) 446-2400
Contact: Meredith Holland

FORSYTH COUNTY (DV/SA)
FAMILY SERVICES, INC.
610 Coliseum Drive
Winston-Salem, NC 27106
Office Phone: (336) 722-8173
Fax Number: (336) 724-6491
Crisis Phone: (336) 723-8125
Sexual Assault: (336) 722-4457
Contact: Michael Turner

FRANKLIN COUNTY (DV)
serves Granville, Vance & Warren Counties
SAFE SPACE, INC.
102 South Main Street
PO Box 240
Louisburg, NC 27549
Office Phone: (919) 497-5444
Fax Number: (919) 497-1761
Crisis Phone: (919) 497-1761
Contact: Janeen Haller

GASTON COUNTY (DV)
THE SHELTER OF GASTON COUNTY
c/o Gaston County Department of Social Services
330 N. Marietta Street
Gastonia, NC 28052
Office Phone: (704) 862-7500
Fax Number: (704) 852-6004
Crisis Phone: (704) 852-6000
Contact: Cathy Cloninger

GASTON COUNTY (SA)
AVID/FAMILY SERVICE, INC.
214 E. Franklin Blvd.
Gastonia, NC 28052
Office Phone: (704) 864-7704
Fax Number: (704) 853-8018
Crisis Phone: (704) 864-0060
Contact: Dewey Matherly

GATES COUNTY
see Hertford and Pasquotank Counties

**GRAHAM COUNTY (DV)*
service provided through Swain County
SWAIN/QUALLA SAFE, INC.
PO Box 1416
Bryson City, NC 28713
Office Phone: (828) 488-9038
Fax Number: (828) 488-1620
Crisis Phone: (828) 488-6809
(Bryson City)
(828) 497-2518
(Cherokee)
Contact: Darlene Bradley

GRANVILLE COUNTY
see Durham and Wake Counties

**GREENE COUNTY (DV)*
service provided through Lenoir County
S.A.F.E. IN LENOIR COUNTY
PO Box 3092
Kinston, NC 28502-3092
Office Phone: (252) 523-5573
Fax Number: (252) 523-9888
Crisis Phone: (252) 523-5573
Contact: Sue Lawson

GUILFORD COUNTY (DV/SA)
FAMILY SERVICE OF THE PIEDMONT, INC.
301 E. Washington Street
Greensboro, NC 27401
Office Phone: (336) 889-6161
Fax Number: (336) 889-3852
Crisis Phone: (336) 273-7273
Contact: Cathy Purvis

GUILFORD COUNTY (DV/SA)
FAMILY SERVICE OF THE PIEDMONT, INC.
1401 Long Street
High Point, NC 27262
Office Phone: (336) 889-6161
Fax Number: (336) 889-3852
Crisis Phone: (336) 889-7273
Contact: Cathy Purvis

HALIFAX COUNTY (DV/SA)
serves Western Northampton County
HANNAH'S PLACE, INC.
PO Box 1392
Roanoke Rapids, NC 27870
Office Phone: (252) 537-2882
(252) 535-5946
Fax Number: (252) 308-9781
Crisis Phone: (252) 537-2909
Contact: Martha Merritt (DV)
Pamela Coyne (SA)

HARNETT COUNTY (DV/SA)
S.A.F.E. OF HARNETT COUNTY, INC.
PO Box 728
1210 South Main Street
Lillington, NC 27546
Office Phone: (910) 893-7233
Fax Number: (910) 893-3508
Crisis Phone: (910) 893-7233
Contact:

HAYWOOD COUNTY (DV/SA)
REACH OF HAYWOOD COUNTY, INC.
PO Box 206
Waynesville, NC 28786
Office Phone: (828) 456-7898
Fax Number: (828) 452-0960
Crisis Phone: (828) 456-7898
Contact: Julia Freeman

HENDERSON COUNTY (DV)
MAINSTAY, INC.
125 South Main Street
Hendersonville, NC 28792
Office Phone: (828) 693-3840
Fax Number: (828) 696-8104
Crisis Phone: (828) 693-3840
Contact: Jan Hester

HENDERSON COUNTY (SA)
THE HEALING PLACE
PO Box 2461
Hendersonville, NC 28793
Office Phone: (828) 692-0495
Fax Number: (828) 692-0433
Crisis Phone: (828) 692-3931
Contact: Terri Wallace

HERTFORD COUNTY (DV/SA)
serves Gates, Bertie & Northampton Counties
ROANOKE-CHOWAN S.A.F.E.
PO Box 98
Ahoskie, NC 27910
Office Phone: (252) 332-1933
(252) 332-4047
Fax Number: (252) 332-2450
Crisis Phone: (252) 332-1933
Contact: Connie Piland

**HOKE COUNTY (DV)*
service provided through Moore County
WITH OPEN ARMS
128 W. Elwood Avenue
Raeford, NC 28376
Office Phone: (910) 904-7182
Fax Number: (910)
Crisis Phone: (910) 947-3333
Contact: Karen Mosely

HYDE COUNTY
see Beaufort County

IREDELL COUNTY (DV/SA)
serves Alexander, Surry & Davie Counties
FIFTH STREET MINISTRIES
DIAKONOS, INC.
PO Box 5217, 1400 Fifth Street
Statesville, NC 28687
Office Phone: (704) 872-4045
Fax Number: (704) 873-3319
Crisis Phone: (704) 872-3403
Contact: Patti West

JACKSON COUNTY (DV/SA)
REACH OF JACKSON COUNTY, INC.
PO Box 1908
Sylva, NC 28779
Office Phone: (828) 631-4488
Fax Number: (828) 631-4477
Crisis Phone: (828) 586-8969
After Hours: (828) 586-1911
Contact: Jean Bockstahler

JOHNSTON COUNTY (DV/SA)
HARBOR, INC.
PO Box 1903
Smithfield, NC 27577
Office Phone: (919) 938-3566
Fax Number: (919) 938-4515
Crisis Phone: (919) 934-6161
Contact: Keri Christensen

**JONES COUNTY (DV)*
service provided through Craven County
COASTAL WOMEN'S SHELTER
PO Box 13081
1333 S. Glenburnie Road
New Bern, NC 28561
Office Phone: (252) 638-4509
Fax Number: (252) 638-1298
Crisis Phone: (252) 638-5995
Contact: Joan Cantor

LEE COUNTY (DV/SA)
HAVEN IN LEE COUNTY, INC.
PO Box 3191
310 N. Steele Street
Sanford, NC 27330
Office Phone: (919) 774-8923
Fax Number: (919) 775-7114
Crisis Phone: (919) 774-8923
Contact: Susan King

LENOIR COUNTY (DV/SA)
serves Greene County
S.A.F.E. IN LENOIR COUNTY, INC.
PO Box 3092
Kinston, NC 28502
Office Phone: (252) 523-5573
Fax Number: (252) 523-9888
Crisis Phone: (252) 523-5573
Contact: Sue Lawson

LINCOLN COUNTY (DV)
LINCOLN COUNTY COALITION AGAINST DOMESTIC VIOLENCE
PO Box 476
Lincolnton, NC 28092
Office Phone: (704) 736-0112
Fax Number: (704) 736-0171
Crisis Phone: (704) 736-1224
Contact: Vicky Lingerfelt

MACON COUNTY (DV/SA)
REACH OF MACON COUNTY, INC.
PO Box 228
Franklin, NC 28744
Office Phone: (828) 369-5544
Fax Number: (828) 524-4535
Crisis Phone: (828) 369-5544
Contact: Elbie Stiles (DV)
Ann Van Harlingen (SA)

MADISON COUNTY (DV)
HELPMATE OF MADISON COUNTY, INC.
PO Box 457
Marshall, NC 28753

Office Phone: (828) 649-2582
Fax Number: (828) 649-3139
Crisis Phone: (828) 649-2446
Contact: Kathy Jacobs

MADISON COUNTY (SA)
OUR VOICE MADISON COUNTY
PO Box 395
Marshall, NC 28753
Office Phone: (828) 649-3912
Fax Number: (828) 649-2156
Crisis Phone: (828) 255-7576
Contact: Cynthia Shaffer

**MARTIN COUNTY (DV)*
served by Beaufort & Washington Counties
OPTIONS TO DOMESTIC VIOLENCE & SEXUAL ASSAULT, INC.
PO Box 1387
Washington, NC 27889
Office Phone: (252) 792-7169
Fax Number: (252) 792-7169
Crisis Phone: (252) 792-7169
Contact: Tiffany Baker

MCDOWELL COUNTY (DV/SA)
FAMILY SERVICES OF MCDOWELL COUNTY, INC.
PO Box 1572
Marion, NC 28752
Office Phone: (828) 652-8538
Fax Number: (828) 659-1456
Crisis Phone: (828) 652-6150
Contact: C. P. Whitaker

MECKLENBURG COUNTY (DV)
UNITED FAMILY SERVICES
SHELTER FOR BATTERED WOMEN
PO Box 220312
Charlotte, NC 28222
Office Phone: (704) 332-2513
Fax Number: (704) 332-5403
Crisis Phone: (704) 332-2513
Contact: Nancy Nicholson

MECKLENBURG COUNTY (SA)
UNITED FAMILY SERVICES/VICTIM ASSISTANCE
618 N. College Street
Charlotte, NC 28202
Office Phone: (704) 336-2190
Fax Number: (704) 375-9910
Crisis Phone: (704) 375-9900
Contact: Annette Morrison

***MITCHELL COUNTY (DV/SA)*
MITCHELL COUNTY SAFEPLACE
PO Box 544
Spruce Pine, NC 28777
Office Phone: (828) 765-4044
Fax Number: (828) 765-4011
Crisis Phone: (828) 765-4044
Contact: Joan Crummey

MONTGOMERY COUNTY (DV/SA)
serves Stanley County
CRISIS COUNCIL, INC.
PO Box 0
Troy, NC 27371
Office Phone: (910) 572-3749
Fax Number: (910) 572-3749
call prior to faxing
Crisis Phone: (910) 572-3747
(800) 551-5497
Contact: Cathy Harris

MOORE COUNTY (DV/SA)
serves Hoke County
FRIEND TO FRIEND
PO Box 1508, 111 McNeill Street
Carthage, NC 28327
Office Phone: (910) 947-3333
Fax Number: (910) 947-1849
Crisis Phone: (910) 947-3333
Contact: Bonnie Kalte

**NASH COUNTY (DV)*
SATELLITE OFFICE-opening 4/00 financial assistance provided by Edgecombe County
MY SISTER'S HOUSE
106 N.Boddie Street
Nashville, NC 27856
Office Phone: (252) 462-0366
Fax Number:
Crisis Phone: (252) 446-2400
Contact: Meredith Holland

NEW HANOVER COUNTY (DV)
DOMESTIC VIOLENCE SHELTER AND SERVICES, INC.
PO Box 1555
Wilmington, NC 28402
Office Phone: (910) 343-0703
Fax Number: (910) 343-9388
Crisis Phone: (910) 343-0703
Contact: Mary Ann Lama

NEW HANOVER COUNTY (SA)
COASTAL HORIZON CENTER, INC.
3333 Wrightsville Ave., Ste. 100
Wilmington, NC 28403
Office Phone: (910) 392-7460
Fax Number: (910) 392-0628
Crisis Phone: (910) 392-7460
Contact: Amy Feath

**NORTHHAMPTON COUNTY (DV)*
service provided through Hertford County
ROANOKE-CHOWAN S.A.F.E.
PO Box 98
Ahoskie, NC 27910
Office Phone: (252) 332-1933
(252) 332-4047
Fax Number: (252) 332-2450
Crisis Phone: (252) 332-1933
Contact: Connie Piland

ONSLOW COUNTY (DV/SA)
ONSLOW WOMEN'S CENTER, INC.
PO Box 1622
Jacksonville, NC 28541
Office Phone: (910) 347-4000
Fax Number: (910) 347-7960
Crisis Phone: (910) 347-4000
Contact: Donald Shreve

ORANGE COUNTY (DV)
ORANGE/DURHAM COALITION FOR BATTERED WOMEN
PO Box 688
Durham, NC 27702
Office Phone: (919) 688-4015
Fax Number: (919) 403-7075
Crisis Phone: (919) 929-7122
Contact: Ada Gregory

ORANGE COUNTY (SA)
ORANGE COUNTY RAPE CRISIS CENTER
PO Box 4722
825 A. Estes Drive, 27514
Chapel Hill, NC 27515-4722
Office Phone: (919) 968-4647
Fax Number: (919) 968-4677
Crisis Phone: (919) 967-7273
(800) 616-3696
Contact: Margaret Barrett

**PAMLICO COUNTY (DV)*
service provided through Craven County
COASTAL WOMEN'S SHELTER
PO Box 13081
1333 S. Glenburnie Road
New Bern, NC 28561

Office Phone: (252) 638-4509
Fax Number: (252) 638-1298
Crisis Phone: (252) 638-5995
Contact: Joan Cantor

PASQUOTANK COUNTY (DV/SA)
serves Camden, Chowan, Currituck, Gates & Perquimans Counties
ALBEMARLE HOPELINE
PO Box 2064
Elizabeth City, NC 27906-2064
Office Phone: (252) 338-5338
Fax Number: (252) 338-2952
Crisis Phone: (252) 338-3011
Contact: Patricia Youngblood

***PENDER COUNTY (DV/SA)*
SAFE HAVEN OF PENDER, INC.
PO Box 657
110 North Walker Street
Burgaw, NC 28425
Office Phone: (910) 259-8989
Fax Number: (910) 259-9410
Crisis Phone: (910) 259-8989
Contact: Edward L. Minnich

PERQUIMANS COUNTY
see Pasquotank County

PERSON COUNTY (DV)
SAFE HAVEN OF PERSON COUNTY
PO Box 474
Roxboro, NC 27573
Office Phone: (336) 597-8699
Fax Number: (336) 597-9318
Crisis Phone: (336) 597-7233
Contact: Vicki Clayton

PITT COUNTY (DV)
NEW DIRECTIONS
(FAMILY VIOLENCE PROGRAM, INC. OF PITT COUNTY)
PO Box 8429
Greenville, NC 27835
Office Phone: (252) 758-4400
Fax Number: (252) 752-4197
Crisis Phone: (252) 752-3811
Contact: Diana Lucas

PITT COUNTY (SA)
REAL CRISIS INTERVENTION, INC.
600 E. 11th Street
Greenville, NC 27858
Office Phone: (252) 758-4357
Fax Number: (252) 758-0455
Crisis Phone: (252) 758-4357
Contact: Mary L.Smith

POLK COUNTY (DV/SA)
STEPS TO HOPE, INC.
PO Box 518
107 Ward Street
Columbus, NC 28722
Office Phone: (828) 894-2340
Fax Number: (828) 894-3044
Crisis Phone: (828) 894-2340
Contact: Rachel Ramsey

RANDOLPH COUNTY (DV/SA)
RANDOLPH COUNTY FAMILY CRISIS CENTER, INC.
PO Box 2161
Asheboro, NC 27204-2161
Office Phone: (336) 629-4159
Fax Number: (336) 629-0770
Crisis Phone: (336) 629-4159
Contact: Elaine Haigler

RICHMOND COUNTY (DV)
serves Anson County
RAINBOW HOUSE
(RICHMOND COUNTY MENTAL HEALTH SOCIETY)
101 Rockingham Rd.
Rockingham, NC 28379
Office Phone: (910) 997-2173
Fax Number: (910) 895-6012
Crisis Phone: (910) 582-1935
Contact: Kay Brickhouse

RICHMOND COUNTY (DV/SA)
WOMENFOLK UNLIMITED
PO Box 205
Rockingham, NC 28380
Office Phone: (910) 997-4840
Fax Number: (910) 997-7444
Crisis Phone: (910) 995-1872
Contact: Dawn Moses

ROBESON COUNTY (DV)
serves Bladen County
SOUTHEASTERN FAMILY VIOLENCE CENTER
PO Box 642
Lumberton, NC 28359-0642
Office Phone: (910) 739-8622
Fax Number: (910) 739-1180
Crisis Phone: (910) 739-8622
Contact: Debra Fowler

ROBESON COUNTY (SA)
RAPE CRISIS CENTER OF ROBESON COUNTY
PO Box 1564
Lumberton, NC 28359-1564
Office Phone: (910) 739-6278
Fax Number: (910) 739-0986
Crisis Phone: (910) 739-6278
Contact: Margaret Crites

***ROCKINGHAM COUNTY (DV/SA)*
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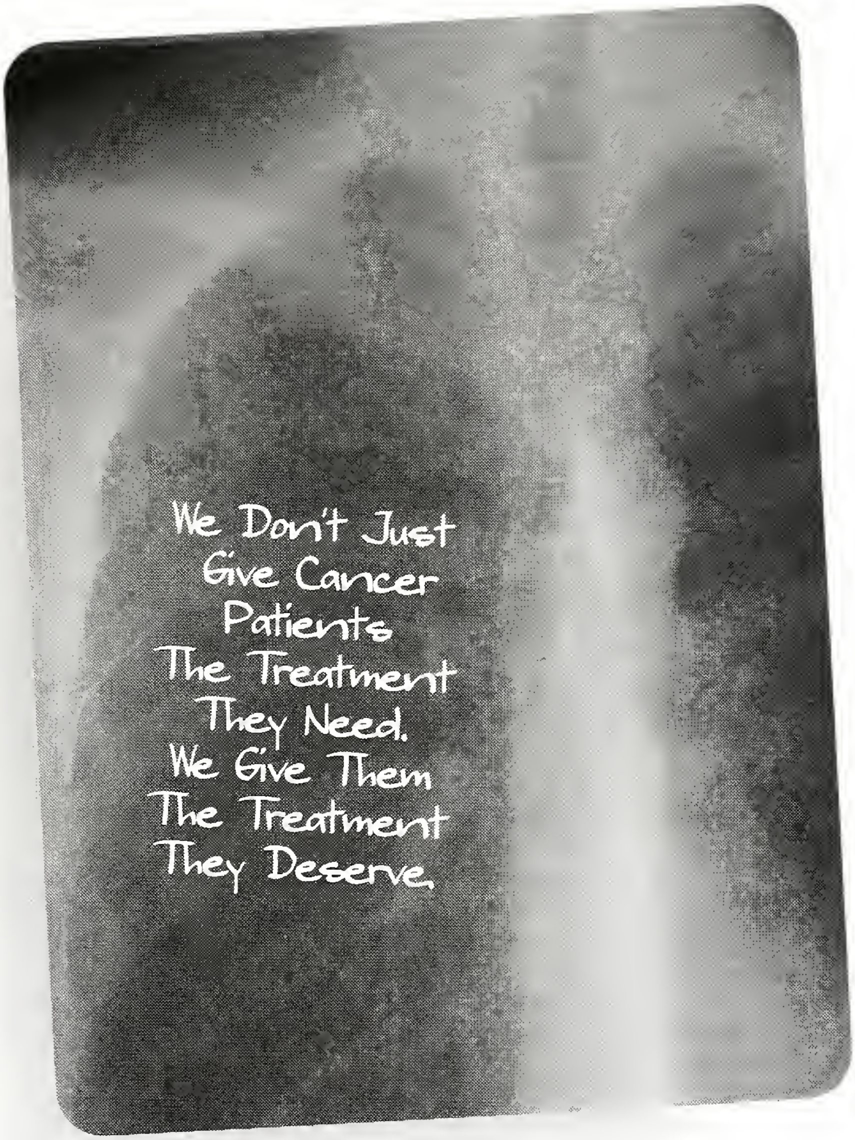

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Running the Numbers

A Periodic Feature to Inform North Carolina Physicians and Their Patients
About Current Topics in Health Statistics

Paul A. Buescher, PhD, Editor

Surveillance of Birth Defects and Other Adverse Pregnancy Outcomes

Birth defects and preterm delivery are the leading causes of infant mortality and childhood disability. Each year in North Carolina between 3,000 and 4,000 infants are born with serious birth defects. An additional 1,500 - 2,000 infants are delivered very prematurely (< 33 weeks gestation). More than 70% of infants who die have one or more major birth defects or are delivered very prematurely.

North Carolina is one of about 35 states that maintain a population-based surveillance system to monitor the occurrence of birth defects and related adverse pregnancy outcomes. Our surveillance program, located in the State Center for Health Statistics, began in 1987 as a "passive" system. Cases were ascertained by linking various existing databases, such as vital records and hospital discharge data. Because of problems with the completeness and accuracy of birth defect diagnoses in these data sources, in 1997 North Carolina initiated a pilot "active" surveillance program, in which trained staff systematically reviews and abstracts medical records to collect information on infants diagnosed with birth defects.

Access to medical records was authorized in 1995 by the North Carolina General Assembly. That legislation, which established the Birth Defects Monitoring Program, also protects the confidentiality of all data collected by the program. Initially funded by the March of Dimes and the Centers for Disease Control, the pilot surveillance system monitors about 30 different types of birth defects diagnosed at the state's 12 tertiary hospitals. Beginning this year, new appropriations from the General Assembly will allow the program to significantly expand its coverage. A major goal of the Birth Defects Monitoring Program during the coming years is to expand coverage to include all birth defects as well as all infants born very prematurely.

The thalidomide tragedy of the late 1950s and early 1960s provided the initial impetus in the US and elsewhere for ongoing surveillance of birth defects. Growing concerns in the 1970s and 1980s over potential environmental health risks resulted in the expansion of surveillance systems in the US. In addition to their use in monitoring geographic patterns and temporal trends in birth defects, these surveillance systems are proving valuable in other ways. They can help to assess the need for and improve delivery of specialized services such as genetics, speech and hearing, and early intervention programs. Several states use birth defects surveillance systems to identify and refer children and families to these services. The systems are also useful for targeting and evaluating the effectiveness of prevention programs such as folic acid education, and for supporting epidemiologic research.

A future article in this series will present some statistics from the North Carolina Birth Defects Monitoring Program. For questions or further information contact Dr. Robert Meyer at (919) 715-4476 or robert.meyer@ncmail.net. Go to the National Birth Defects Prevention Network web site (http://www.nbdpn.org) for more information on birth defects and links to related sites.

From the State Center for Health Statistics
www.schs.state.nc.us/SCHS
North Carolina Department of Health and Human Services

Domestic Violence and Children

A Review

Rebecca R.S. Socolar, MD, MPH

Millions of children are exposed to domestic violence every year in the United States, but we have no accurate, reliable information about the prevalence and nature of the exposure. Estimates ranging from 3 to 10 million children exposed per year are derived from studies on the prevalence of domestic violence and the number of children possibly involved.[1-3] One difficulty with determining the magnitude of the problem is the lack of a standard definition of domestic violence. Usually the term refers to violence between adult intimate partners, but it can range from acts of physical harm (including involuntary sexual acts), to the threat of harm, to psychological attacks or economic coercion. In addition, there is no clear distinction between children who actually witness domestic violence (by being present when it happens), and those otherwise exposed (such as hearing shouting or later seeing the injuries inflicted). North Carolina has no population-based statistics about domestic violence, but data collected from domestic violence programs indicate over 39,000 victims of domestic violence in 1998-99, of which 1,898 were men, and 1,287 were less than 18 years old. There were 27,670 secondary victims, most of them children who witnessed violence.[4]

Both adult partners may be actively involved in domestic violence, but women are much more likely than men to be injured physically and to incur psychological consequences of abuse. Many violent parents think that they protect children from the violence, but 80% of children say otherwise.[5] Most children not only know what happened, but can give detailed descriptions of how the violence escalates. Children are present in approximately 25% of the extreme cases, when women are murdered by their husbands.[6]

Effects of Domestic Violence on Children

Research on the effects of domestic violence on children is not very well developed, but it is likely that witnessing violence harms children as much as being physically abused.[7] The reported effects of violence on children fall into several large categories: externalizing behaviors; internalizing behaviors; and poor performance (Table 1).[8] In general, boys are more susceptible to externalizing behaviors, girls to internalizing behaviors.[9] Children's immediate reactions to family violence include fear, anger, trying to avoid the danger, and trying to protect their mother. The effects of violence on children depend on their developmental ages; very young children are likely to exhibit sleep disturbances or separation anxiety,[10] school age children to have somatic complaints, and adolescents to be suicidal or sexually precocious[11] (Table 2).

The long-term effects of domestic violence depend on the age and gender of the child,[12,13] the severity, intensity, and chronicity of the violence, and the child's perception of his or her role in the violence. The effects of domestic violence are likely to depend upon whether there is associated child abuse, with more severe consequences likely if children both witness abuse of adults and are themselves victims of maltreatment.[14,15] A variety of long-term effects are possible (Table 3). One study of patients with post-traumatic stress disorder found that most children exposed to physical maltreatment of their mother by their father had intrusive, re-experiencing symptoms; 40% had traumatic arousal symptoms; and more than 10% had full-fledged post-traumatic stress disorder.[16] Adolescents from violent families have less self-esteem, more depression, and more delinquency.[17] Sons of severe batterers are ten times more likely than the sons of nonviolent fathers to themselves become wife batterers. Daughters of batterers are less likely to question violence by men, and less likely to seek assistance if they are themselves abused.[2]

It is important to note that not all children are damaged by being exposed to violence; some children are very resilient. Some boys exposed to violence grow up to be nonviolent, nurturing fathers and husbands, and some girls become confident and assertive. Protective factors that have been identified include alternative adult role models, strong and positive attachments to the mother, and extensive supports within the community.[6]

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Table 1. Effects of violence on children

- Externalizing behaviors
  - Aggression
  - Delinquency
  - Acting out
  - Anti-social behavior
- Internalizing behaviors
  - Withdrawal
  - Anxiety
  - Depression
- Poor performance
  - School
  - Sports
  - Organized activities

Table 2. Short-term effects of violence on children

- 0-5 Years
  - Sleep disturbances
  - Bed-wetting
  - Separation anxiety
  - Failure to thrive
- 6-12 Years
  - Eating disturbances
  - Somatic complaints
  - Fears of abandonment/loss of control
- Adolescents
  - Running away
  - Delinquency
  - Sexual precocity/pregnancy
  - Suicidal/homicidal thoughts
  - Drug/alcohol abuse
  - Eating disturbances

Table 3. Long-term effects of domestic violence on children

- Post-traumatic stress disorder
- Low self-esteem
- Depression
- Somatic complaints
- Delinquency and criminal behavior
- Sons of batterers more likely to become batterers
- Daughters of batterers more likely to become victims of domestic violence

Child Maltreatment and Domestic Violence

It is common for child maltreatment and domestic violence to exist in the same families. Conservative estimates claim a 30-60% overlap between the 1 million children and 2 million women abused each year in the United States.[11] The overlap of child maltreatment and domestic violence has been studied by asking women in shelters about whether their children have been physically or sexually abused, and by searching for evidence of woman-battering in the families referred to Child Protective Services (CPS).[9] Both methods tend to underestimate the incidence of co-existent abuse because they look only at cases brought to the attention of battered women's shelters or CPS.[11] Men are the usual perpetrators of violence against both women and children in instances of co-occurrence, but it is true that battered women are two times more likely than non-battered women to physically abuse their children.[18]

Studies of the family factors associated with partner and child abuse indicate that both types of family violence are more common when there are more life stressors, greater socioeconomic disadvantage, neighborhood violence, poor maternal mental health, and history of severe physical punishment of the father as a child.[19] This suggests that abuse of women and children usually occurs in a broader context of family dysfunction.

Screening For and Assessing Domestic Violence

Children who are exposed to domestic violence may first be recognized through the legal system in criminal or civil court, through the CPS system during investigation of reports of maltreatment or - increasingly - reports of domestic violence per se; through battered women's programs, schools and other community settings, or through healthcare settings. Until recently, these systems viewed domestic violence as a problem of adults, and mechanisms for response were geared towards adult issues. As evidence has mounted that domestic violence harms children, it has become clear that we need to screen and assess on behalf of children and their families.

The healthcare system has recently developed protocols and training that enable clinicians to identify and respond to victims of domestic violence. Several national medical organizations have published practice guidelines that encourage routine screening and intervention for intimate partner violence.[20-23] Currently most hospitals have such protocols in place, although training in their use is less routine. However, because of the focus on treatment of the individual, the well-being of the children of adult domestic violence victims gets little attention in most adult healthcare settings.[24] A recent survey of doctors in family medicine, internal medicine, and obstetrics/gynecology found that 79% of these primary care providers routinely screened *injured* patients for intimate partner violence, but only 10% screened at new visits or check-ups, and only 10% during prenatal care. Barriers to victim identification and referral included the patient's fear of retaliation by the abuser (80%) or of police involvement (55%).[25] Another study found that physicians equated looking for domestic violence with "opening Pandora's box," and

Table 4. Examples of screening questions for detecting domestic violence

American College of Obstetricians and Gynecologists:

Because violence is so common in many women's lives and because there is help available for women being abused, we now ask every patient about domestic violence.

- Within the past year - or since you have been pregnant - have you been hit, slapped, kicked, or otherwise physically hurt by someone?
- Are you in a relationship with a person who threatens or physically hurts you?
- Has anyone forced you to have sexual activities that made you feel uncomfortable?

American Academy of Pediatrics:

We all have disagreements at home. What happens when you and your partner disagree?

- Is there shouting, pushing, or shoving? Does anyone get hurt?
- Has your partner ever threatened to hurt you or your children?
- Do you ever feel afraid of your partner?
- Has anyone forced you to have sex in the last few years?

cited as reasons their lack of comfort, fear of offending, powerlessness, lack of control, and time constraints.[26]

Two important considerations in screening for the exposure of children to domestic violence are the setting in which screening takes place, and what to ask.

The Setting: Most practice guidelines encourage routine screening at regular intervals, but especially when there are signs of domestic violence. These signs include evidence of trauma, maternal depression or anxiety, failure to keep appointments, reluctance to talk about home issues, internalizing or externalizing behaviors in children, hypervigilance, and frequent complaints with no apparent basis.[23] In these circumstances, the clinician should talk to the woman alone, away from the possible abuser and her children. The topic should be introduced gently in a way that assures her that the conversation is confidential.

What to Ask: Debate exists about whether to use self-report questionnaires or personal interviews, but the questions recommended and the rates of disclosure are similar for both methods.[27] Details vary, but the components of what to ask generally include a preamble and then a series of specific questions. The preamble explains that basis for concern, and may refer to concern about the safety of family members, the prevalence of domestic violence in our society, and the fact that all women are asked these questions. The specific questions focus on the following: (1) whether the woman has been emotionally or physically hurt by a partner; (2) whether the woman has been forced to have sexual activity; and (3) whether the woman is afraid of her partner (Table 4).

When domestic violence is identified, further information is needed. The clinician must assess the mother's safety, the safety of children in the home, and the desires and motivation of the mother regarding change or leaving her abusive partner. The most dangerous time for a woman and her family is when she is in the process of leaving an abusive partner. Unlike the situation with child abuse, no state agencies are mandated to ensure a woman's safety as she leaves an abuser or afterwards.[23] Either the healthcare provider or the agency to which the woman is referred should devise a safety plan that provides measures to help ensure the safety of the family. For example, if the woman can do so safely, she may be able to remove firearms from the home. She can make advance arrangements for transportation (hiding a set of car keys, arranging transportation with a neighbor, or having a cell phone to call for help); she can have a secret signal that will alert a neighbor of trouble; she can make copies of important documents, should quick escape be necessary; she can limit arguments with the partner to relatively safe places (not the bathroom or kitchen), in rooms with two exits.

The clinician needs a working knowledge of community resources that can provide safety, advocacy, and support. A national, toll-free hotline - 1-800-799-SAFE - can provide information about local resources on domestic violence to all providers or victims. Only five states (California, Kentucky, New Hampshire, New Mexico, and Rhode Island)[24] require that healthcare providers report adult domestic violence, but many states require the reporting of particular types of wounds and injuries. In North Carolina, wounds, injuries, nd illness caused by guns or knives, and any wound causing "grave bodily harm" that appears to have resulted from a criminal act must be reported to law enforcement by the treating physician.[28]

It is important to be discreet when giving information about family and partner violence to children or their caregivers. If the abuser discovers the information, the victim may be at increased risk. If the woman feels safe, she should be given written information about legal and crisis counseling and shelters.[23] Mental health and substance abuse services are also often relevant. If child maltreatment is discovered, it must be reported to Child Protective Services, and the mother should be told that the report is required by law.

Response to Child Maltreatment and Domestic Violence

Despite the substantial overlap between child abuse and domestic violence, the delivery of services to abused women and maltreated children continues to be fragmented rather than coordinated. Several factors contribute to this fragmentation - domestic violence and child protective services have different philosophies and histories, they use different terminology, and they generally see themselves as having different missions. Domestic violence programs and shelters were developed to meet the needs of battered women, not their children, and had largely grassroots origins in the civil rights and feminist movements. The primary goal of this movement is to help the abused woman assess her situation, regain a sense of strength, and seek the surest and safest path away from continued violence. Empowerment of women is at the heart of the agenda.

On the other hand, Child Protective Services provide specialized casework services to potentially neglected, abused, or exploited children and their families. The roots of CPS are in the social work profession, and in the use of a problem-solving approach based on determining and protecting "the best interests of the child." There are laws mandating CPS investigate allegations of child abuse and neglect. Battered women's programs want to hold abusive men accountable, whereas CPS often leaves this to the courts. CPS workers use their leverage with the legal caregiver of the child - usually the mother - to make changes on behalf of the child's safety, including making neglect allegations against the mother for "failure to protect." Massachusetts and Michigan have developed demonstration projects to explore ways to overcome the differences in perspective between the battered women and CPS and to help them collaborate.[29]

In addition to the CPS system and battered women's advocacy organizations, the criminal and civil courts are a critical third system that must be involved on behalf of the safety of all victimized family members. A parent can protect a child by obtaining legal remedies. These include an order for custody of the child; a protective order to exclude an abuser from the home or otherwise restrain him; or imposing conditions of bail, probation, incarceration, or parole through criminal action.[30] Suggested mechanisms for overcoming the current fragmentation of the three systems include cross-training of workers in each system; ongoing communication and consultation; and integration and coordination of services across battered women's organizations, the CPS system, and the court system.[29]

In North Carolina, Governor Jim Hunt convened a Task Force in 1998 to study North Carolina's response to domestic violence. The members of the Task Force, representing diverse aspects of involved communities, split into Committees to (1) review current laws in North Carolina and make suggestions to enhance victim safety and offender accountability; (2) to recommend how to provide services to victims in all of North Carolina's 100 counties, (3) to recommend training for law enforcement and court officials; 4) to suggest how to conduct a statewide public awareness campaign. The final report of the Committees contains 43 recommendations forming the basis of a commission convened to continue the work of the task force.

Conclusion

We are still learning the best ways to identify and assess families whose children are exposed to domestic violence. Research has mostly focused on the natural history of the epidemic of children's exposure to domestic violence. There is some preliminary evidence that clinical,[31,32] social service, and judicial interventions[30] can promote safety and positive adjustment of children and families involved in domestic violence. Identifying and intervening on behalf of battered women may be one of the most effective ways of preventing child maltreatment. Over the next decade, we will want to redouble our efforts to try to treat family members to prevent the adverse effects of domestic violence, to establish effective policies and laws related to domestic violence, and, hopefully, also to find ways to prevent the occurrence of domestic violence.

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Emergency Medical Services Personnel and Domestic Violence

Susan McDaniel Hohenhaus, RN

Family violence pervades society. It does not distinguish class, immigrant status, racial, ethnic, or socioeconomic background. Domestic violence (DV) refers to all violence occurring within a family—child abuse, intimate partner abuse, and elder abuse. Intimate partners may be involved whether currently living together or not. DV is a serious public health problem, as shown by the fact that there are one million incidents of nonfatal intimate partner violence every year in the United States.[1] Each member of society is directly or indirectly affected by private and hidden violence; ignoring abuse or suspected abuse contributes to future abuse.

Table 1. RADAR screening for DV

Routinely screen for domestic abuse.
Ask about abuse.
Document your findings.
Assess for patient safety.
Review the options and make referrals.

Emergency Medical Services (EMS) professionals, especially those who practice outside the hospital setting, can help by learning to recognize, screen, and document suspected or confirmed DV. Governor Jim Hunt made one of the most poignant formulations when he said, "Domestic violence is not just a criminal justice problem or a public health problem. It is a community problem that crosses all boundaries and robs people—especially women and children—of their sense of safety and ability to lead normal lives." EMS professionals in rural, suburban or metropolitan communities attend patients who are victims of DV, but few ask about abuse and many would not know what to do if the response was affirmative. Still, there is a professional responsibility to identify and document injuries caused by DV. We need to recognize that many medical problems have a foundation in DV.

It is important to understand that DV is not just a single event, not just a push into a door or a violent argument. It is a pattern of coercive and controlling behavior that the perpetrator uses to establish and maintain power and control. DV doesn't spontaneously stop or go away; it usually increases in frequency and severity as the perpetrator further entraps the victim of DV. Statistics show that at least 15% of emergency department (ED) visits by women can be attributed to DV.[2] Approximately 25% of women attempting suicide have been battered.[3]

EMS Response to DV

"Social intervention" has not been a traditional role for EMS providers, but identification and intervention of a serious public health problem falls well within the expanded practice (injury prevention) issues with which EMS is increasingly involved. DV can shatter a life as suddenly and permanently as a motor vehicle crash, or it can erode physical and emotional well-being as painfully and slowly as the most insidious cancer. EMS providers don't always know how to help DV patients, making DV more frightening than a motor vehicle crash (MVC) or a medical emergency. Well-rehearsed standard care protocols are applied to help save the life of motor vehicle crash victims, and to provide resources for others at the scene of the crash. In the emergency department, an entire team of professionals stands ready to care for the patient. All are all operating within the same standard of care for the patient. But we do not have the same level of education, information or protocols upon which to base clinical practice for victims of DV.

Patients have physical injuries or illnesses that need care, but they also have emotional and legal issues that need to be addressed. Rather than expecting victims of DV to manage their own "follow-up" in a system ill-prepared to deal with the problem, we need a system to provide knowledge,

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Table 2. "Red flag" signs of DV

- Lack of consistency between history and injury
- Frequent request for EMS response to the residence
- Refusal of transport
- Delay in seeking medical care
- A partner who insists on staying nearby and answering questions directed to patient

Table 3. Clues to DV from the physical examination

- Injury during pregnancy
- Multiple injuries in different stages of healing
- Injuries suggestive of defensive posture
- Injuries to head, neck, breasts, abdomen
- Suicide attempts*

*Battered women account for 25% of attempted suicides in women.

information and support for those victims. Households visited by EMS have high risk factor rates for DV, like drug and alcohol abuse.[4] Recognizing clues in the house that point to DV can trigger the EMS provider to offer help that may save the patient's life or those of children in the household.

Beyond medical care, we need a link to the alternate "emergency department"—the justice system that responds to society's non-medical ills. The system needs to care for the person traumatized by DV as well as it does for other types of trauma patients. If EMS professionals are to help battered women and children, they must have intervention protocols that are based on reasonable, well-planned courses of action.

Getting DV on the "Radar" Screen

Any response to DV must begin by recognizing its existence. The EMS response starts when an EMS professional asks questions about the possibility of DV. If not asked at every encounter, the average abused patient will not disclose the role of violence. Asking about abuse sends the message that it is "OK" to discuss violence and abuse. If asked often, patients may realize that they are not alone, that there are others in similar circumstances—so many that EMS questions every patient encountered. Even if the response is negative (and especially when DV is still suspected), keep asking the question! There is a better chance of a positive response during subsequent encounters if the victim has consistently been asked.

Sometimes a negative response reflects the patient's previous bad experiences with healthcare personnel. Bad experiences may be the result of a simple lack of response or overtly inappropriate or insensitive responses. For example, an EMS professional who has responded to an emergency call from a patient who then refuses treatment or transport might comment that "these calls are a waste of time—we just keep coming back here." That sort of remark, overheard by the patient, can inhibit future calls for help.

DV is underreported and under-diagnosed. Despite the large number of battered women seeking medical care for violence-related injuries and illnesses, fewer than three out of every 100 cases are correctly recognized.[3] EMS professionals may be the only health care professionals who actually see the patient in the home environment after a battering incident. At this point, the EMS professional is in a unique position to play a helping role. The first step is to establish a confidential and trusting relationship with the patient. The next step is to be aware of the problem and ask the appropriate questions. A recent study indicates that not even half of EMS agencies in the country encourage personnel to ask patients directly about DV as a cause of injuries.[5] The same study found that nearly 80% of respondents thought that EMS organizations *should* have a formal policy and specific care plans for DV victims, but they did not have any in place. One way to identify DV in our patient population is by use of "RADAR" screening[6] (Table 1).

Universal screening of all patients will improve recognition of DV. Routine screening not only decreases the chance of overlooking abuse, it can also increase effectiveness in helping with the problem. But even negative responses to the routine screening questions should not deter us from looking for and noticing other "red flags" of abuse (Table 2), and certain physical examination clues suggest DV. Any of the findings listed in Table 3 should increase the suspicion that a patient has been battered. One way for EMS personnel to provide a consistent response may be by using the following "rules": 1) Protect, 2) Suspect, 3) Collect, 4) Inspect, 5) Respect.

EMS is obligated to protect the life, health and privacy of the patient, but a DV call may be a dangerous situation, and EMS response teams must also be protected. Since the first recorded case in 1855, some 460 law enforcement officers have died responding to domestic disturbance calls.[7]

Collection of evidence in the emergency setting may consist of gathering and documenting information, diagramming injury patterns, or taking photographs. Assisting law enforcement to take photographs, even those that may be "of an embarrassing nature," can help later. A clinical approach may make evidence gathering less difficult for the patient. In order to document injuries well, the patient's skin must be carefully inspected; if any injury is observed, examining the rest of the patient becomes even more important.

Report any suspicions to other health care practitioners to ensure that the patient will receive a complete exam. Regardless of the patient's age, concern for privacy and the right to refuse further care need to be respected. The local Department of Social Services, law enforcement agencies and DV advocates can help develop policies and procedures for reporting and referring victims of DV in the community.

Asking the Question

EMS professionals have an excellent opportunity to ask questions about DV. It is rare in emergency settings to have as much privacy as can be found in the back of an ambulance. A policy prohibiting ambulance transport of nonpatients takes the patient away from the suspected batterer. Because EMS personnel may be the first to arrive on the scene, they need not only to assess the patient physically, but they must try to prevent further physical or emotional injury. If the patient declines transport, the response of EMS personnel may be the key to persuading the patient to go to the hospital for further evaluation and referral. Use simple, direct language and try not to use terms like "abused," "battered," or "domestic violence" when questioning the patient. These terms may not be familiar or seem relevant to the patient's life and circumstances. A good lead-in to other specific questions is, "Do you feel safe and cared for where you live?" It can be asked of any patient, in any setting or community.

Protocols, Reporting Issues, Recommendations

EMS agencies should develop an organizational approach to caring for patients who may be victims of DV. These protocols should include, at a minimum, *procedures* for assessing abuse, screening, identifying, and ensuring patient safety; *advice* on how to make referrals to institutional, legal, and community resources; *requirements* for evidence collection, medical record documentation, and reporting. Addressing interagency collaboration issues is crucial to the development of protocols, policies, and procedures in this area. These protocols should include provisions for the patient and for other family members such as the elderly or very young who have witnessed DV. Protocols should include recommendations for collaboration with law enforcement officials, the Department of Social Services, and local advocacy groups.

Adopting a protocol does not mean that it will be used. Training about family violence, about physical indicators or "red flag" indicators of violence, and about community resources and agency-reporting requirements can help identify and assist patients who are victims of family violence. The need for universal screening must be emphasized since this provides continued awareness of the problem, even when DV is not an obvious cause of a patient's illness or injury.

Laws about the reporting of DV vary from state to state. Issues surrounding reporting are controversial. Statutes require EMS and other health care providers to report suspected cases of child and disabled adult abuse. If a child in the home witnesses DV, consider discussing the case with local Department of Social Services authorities. It is important to remember that adults have a right to control their own lives and situations. Those who support requiring the reporting of DV believe that reporting will enhance patient safety, improve the health care system and assist in data collection; those who oppose it feel that reporting will keep victims from seeking help at any level. Abused women in general oppose mandatory reporting laws, citing fear of retaliation by the abuser, mistrust of the "system," fear of family separation, and preference for confidentiality and autonomy.[8]

Conclusion

Domestic violence is a preventable cause of injury and illness. EMS providers, the first line of defense in health care, may be aware of DV before any other care provider. In their role as injury prevention advocates and community activists, EMS personnel need to respond to the problem of DV. EMS personnel should be trained to identify and document DV, assess patient and personnel safety, offer resources, and empower victims to make choices. This information should be part of general EMS education, and included in continuing education programs.

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Lethal Domestic Violence in Eastern North Carolina

M. G. F. Gilliland, MD, Paul R. Spence, MD, and Ronda L. Spence, MS

Abstract

Strategies for preventing domestic violence can be tailored to a particular geographic or socioeconomic area if the patterns of domestic violence in the area are known. National statistics, although widely available, may not be applicable to a specific region. We reviewed homicide deaths in Eastern North Carolina between 1978 and 1999 to identify patterns in this rural area. Approximately 20% of the homicide deaths in eastern North Carolina are caused by intimate partners. Women accounted for 53% of the victims in 1976, similar to national figures but not rising to 72% as seen nationally in 1998. Latinos are an increasing presence in the area, but had only one recorded episode of lethal violence against an intimate partner. Gunshots accounted for most of the deaths (59% in men, 72% in women). Knowledge of such patterns can assist in selecting prevention strategies for this particular area.

Over the last 25 years increasing attention has been devoted to domestic violence (DV), initially defined as abuse committed against a spouse, former spouse, fiancée, boy- or girlfriend, or cohabitant.[1] As time has passed, the definition has been broadened to include other family members—elders, children, and siblings. The Centers for Disease Control and Prevention (CDC) now uses the term "intimate partner violence" for intentional emotional or physical abuse inflicted by a spouse, ex-spouse, a present or former boy- or girlfriend, or date. [2] For the purposes of this paper, we consider DV interchangeable with intimate partner violence. There has been a national concern that abusive events are under-reported. The National Crime Victimization Survey, an anonymous household survey, indicated nearly 1 million incidents of non-lethal intimate partner violence per year between 1992 and 1996.[3] The number decreased from 1.1 million in 1993 to 840,000 in 1996.[3] Attempts to validate such data for a given geographic area often require subjects to violate anonymity—this may account for lower reports of violence.[4] A recent national report from the Justice Department found a decline in both lethal and non-lethal DV. The number of men murdered by wives or girlfriends "plunged 60% from 1976 through 1998".[1] FBI data on homicides showed that "intimate partners committed fewer murders each year during 1996, 1997, and 1998 than in any other year since 1976".[1] Nationally, intimate partners caused 3000 deaths in 1976, 1590 (53%) in women; in 1998, they caused 1830 deaths, 1320 (73%) in women.[1]

But fatal cases of DV are only the tip of the iceberg, and may pertain only to a particular geographic area. We undertook the present study to assess the prevalence of lethal domestic violence in the 29 counties of eastern North Carolina (ENC) that make up the catchment area for the University Health Systems of Eastern Carolina (UHSEC). UHSEC includes the Brody School of Medicine at East Carolina University (BSM-ECU; previously known as East Carolina University-SOM) and Pitt County Memorial Hospital.

Materials and Methods

All deaths occurring in the study region between October 1978 and December 1999 were reviewed. Those designated as homicides were further reviewed and categorized. Domestic violence deaths were defined as those inflicted by the spouse or significant other on spouses, ex-spouses, or spouse-equivalents or bystanders killed. Child abuse and other in-family deaths were counted separately. Based on information in the case files, we listed other broad categories of homicide, including known assailant (not specified but not spousal or familial and no further information), unknown assailant (and no further information), and due to argument, robbery, or drug-related.

As law enforcement agencies become more familiar with forensic pathology and data collection methods, more infor

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Table 1. Causes of homicide deaths investigated at Brody School of Medicine, 1978-1999

Categories*	1978-1989	1990-1999
Domestic violence	131 (31%)	181 (31%)
Intimate partner violence	84 (20%)	114 (19%)
Family violence	28 (7%)	36 (6%)
Child abuse	11 (3%)	29 (5%)
Perinatal deaths	8 (2%)	0 (0%)
Elder abuse	0 (0%)	2 (<1%)
Unknown assailant	114 (27%)	100 (17%)
Known assailant	88 (21%)	59 (10%)
Alcohol/argument	32 (7%)	111 (19%)
Robbery	23 (5%)	59 (10%)
Motor vehicle (hit and run)	19 (4%)	3 (1%)
Drug-related	9 (2%)	59 (10%)
Sexual assault (stranger)	9 (2%)	8 (1%)
Gun accident/hunting	3 (1%)	8 (1%)
Total	428	590
Grand total: 1018		

*Some categorizations changed between recording periods.

mation is available. Domestic violence cases are now routinely referred for autopsy. Adjustment was made for pathologist staffing, which at times limited the number of deaths that could be referred to the facility for autopsy. Local census data for 1980 and 1990 were used for this study.

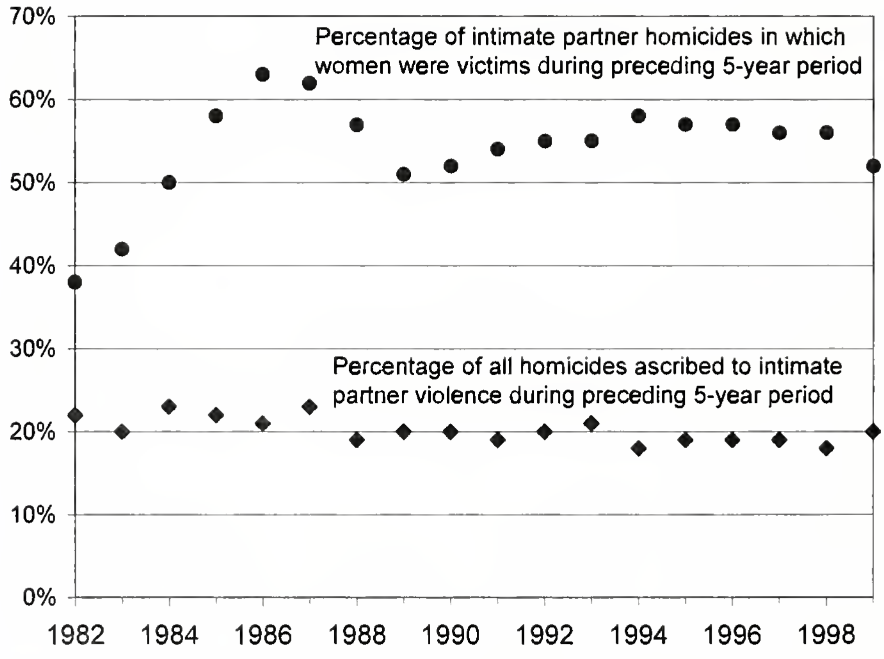

Figure. Percentage of homicides ascribed to intimate partner violence during the preceding five-year period.

Table 2. Victims of intimate partner homicide in Eastern North Carolina, 1978-99

	Men	Women	Total
Male perpetrator	29	108	137
Female perpetrator	67	1	68
Known altercation	16	14	30
Stalked	0	25	25
In the act	1	3	4
Killer hired by spouse	3	0	3
At work (included in 'Stalked')	0	2	2

Results

Table 1 shows the causes of homicide deaths autopsied at Brody SOM. Intimate violence, familial violence, and child abuse accounted for 30% of the homicide deaths in ENC. Data are given for two time periods, the first eleven years of the study (1978-1989) and the last ten (1990-1999).

Table 2 breaks down DV deaths by gender and shows circumstances surrounding the death (when recorded—during the first 11 years such information was not obtained as often as in later years).

Table 3 lists lethal force used in DV deaths (gunshot, sharp object, blunt force injury, asphyxia, other). The data are divided by gender.

The Figure shows moving averages used for 50-year retrospective periods for smoothing the data. The numbers are otherwise too small and variable to show any pattern.

Discussion

Patterns of reporting changed over the 21-year period. As more investigative information became available, circumstances surrounding the death (such as Alcohol/Argument, Drug-Related, and Robbery) could be identified. Perinatal deaths included three children killed at birth and buried by their mother. In the first 11 years, this group included births into toilets and homicides on newborns; babies born into toilets are now categorized as Undetermined. Hit-and-run motor vehicle collisions with pedestrians or other vehicles were classified as homicides in the first 11 years. With more information they are more often classified as accidents with prosecutorial freedom to pursue appropriate charges.

National trends are not always reflected in ENC. For instance, domestic violence deaths continue to show a higher proportion of men (Table 2). About one homicide death in five is due to DV, and the proportion of men to women is variable, possibly even cyclic, as implied by the Figure. One possible explanation for the lack of congruence with reported national trends toward fewer deaths of males by females is the insular, predominantly rural character of ENC.

The difference in ratio of DV to total homicide deaths is striking compared to the national numbers reported in 1996. Nationally, 30% of female and 3% of male homicide victims were killed by an intimate partner;[5] in ENC, 42% of females and 13% of male victims were killed by an intimate partner. Given the small number of homicides in ENC, the percentages may be misleading. A study in Contra Costa County, CA, found that 46% of homicides in women were perpetrated by intimate partners or other family members compared to 11% of men;[6] in ENC the proportions were 50% for women and 18% for men. Nationally, 6 in every 10 female homicide victims are murdered by someone known to them,[7] but that number is closer to 8 in 10 in ENC, possibly because so many people know one another in this rural area.

Most of these violent deaths occurred as a result of gunshots (68% of the female victims and 60% of the male). Shotgun injuries were rather infrequent compared with the distribution seen for the state as a whole; handguns and guns not otherwise specified accounted for 55-58% of deaths statewide and shotguns for 8-10% of deaths.[8]

Only 14% of the female victims were stabbed or cut, but 31% of the male victims were. Many of the histories indicate that the men were not expecting an attack and that the female perpetrator fled afterward. Strangulation or asphyxial deaths account for approximately 2% of the total deaths in the state. Asphyxial deaths are by definition injuries that occur during close physical contact. They account for the deaths of 5% of female victims of intimate partner violence. The single male victim of asphyxiation was choked during a struggle with his partner's new boy friend.

The association between DV and alcohol use reported by victims able to describe the circumstances was 75%,[9] but this was determined from histories provided by law enforcement and was not otherwise recorded. A higher percentage of male than female victims was intoxicated at the time of death. When the perpetrator of DV also committed suicide, the death was classified as DV as well. A study in North Carolina found that 62 of 167 maternal deaths were caused by injury (37%) and that 36% of the injury deaths were the result of homicide.[10] Another study of the same population looked at the frequency of DV and substance abuse in obstetric patients to determine if obstetricians were aware of risk factors. They found that in 51% of injury deaths, the women were known or suspected to have been abused by an intimate partner or acquaintance. In one-third of the intimate partner homicides, the obstetrician was aware of or suspicious of abuse; 27% of the women were known to have abused alcohol or drugs or both.[11]

Table 3. Lethal force in intimate partner deaths

	Men	Women	Total
Gunshot injury	53	71	124
Shotgun injury	4	7	11
Sharp force injury	29	15	44
Blunt force injury	4	8	12
Asphyxia	1	6	7
Bums	0	2	2
Drowning	1	0	1
Not stated	4	0	4
Total	96	109	205

A single couple accounted for most of the domestic disturbance calls in one county in our catchment area. The man eventually inflicted a lethal injury on the partner while both were intoxicated (a usual state of affairs according to the law officers). The jury in the small, rural county where the case was tried believed the defense account that she had initiated the altercation. The man was found guilty of involuntary manslaughter for shooting an unarmed woman in the back of her thigh as she was scrambling to get away from him.

Approximately 20% of homicides in ENC are caused by intimate partners. We found no parallel for the national downward trend in DV homicide in this isolated geographic area. Those in similar socioeconomic and geographic areas need to be aware that the victims and incidents they identify may still correspond to earlier national patterns. Knowing more about the patterns in the area will help shape tactics to prevent lethal domestic violence.

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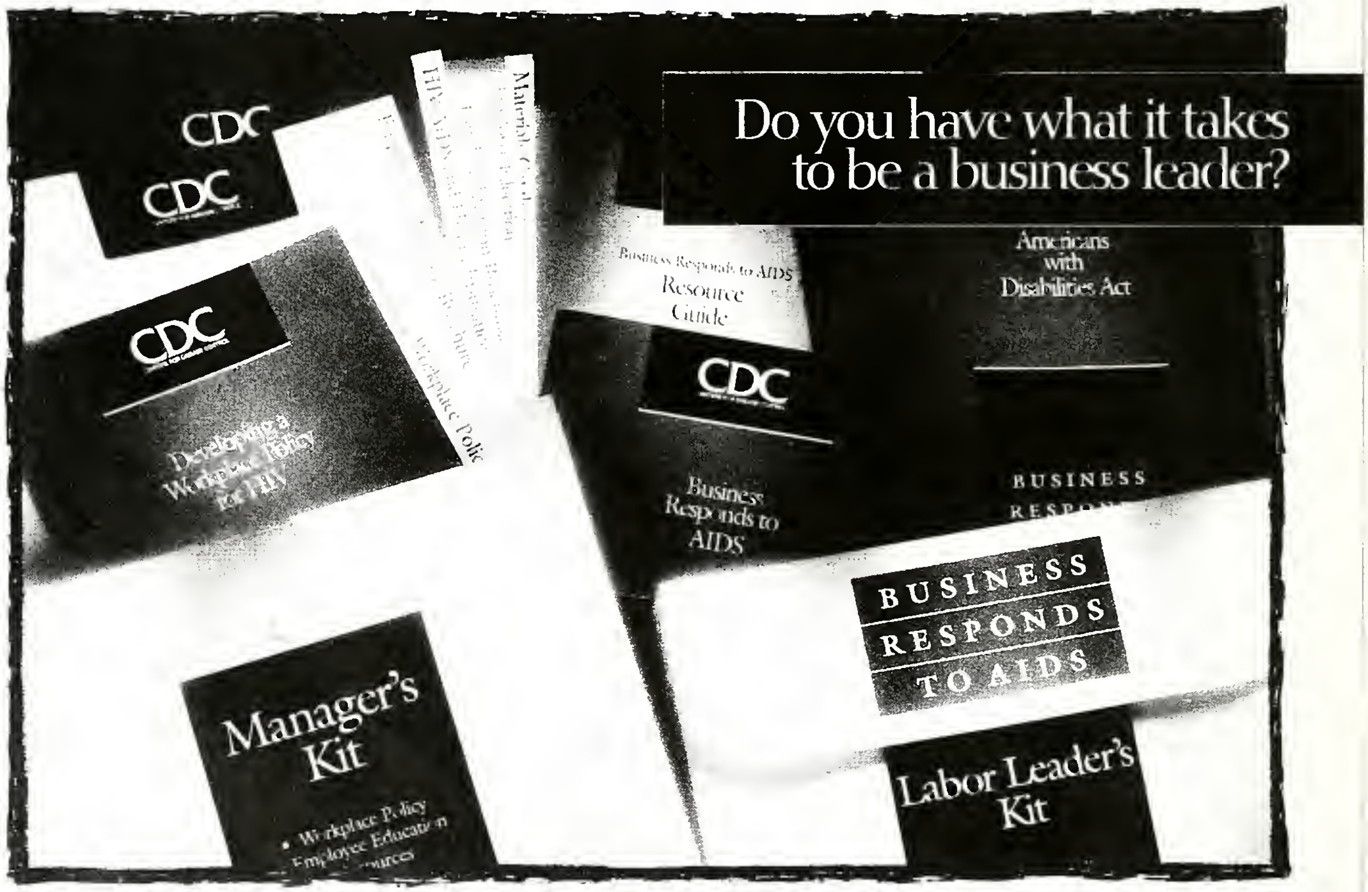
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Elder Mistreatment

A Guide for Medical Professionals

Jill Silverman, MD, and Margaret F Hudson, PhD, RN

Abuse and neglect of elders form part of the spectrum of violence that plagues many societies today. "Abuse" in this context refers to a misuse of power, and "neglect" to indifference (or lack of information about) the basic human needs of another. Elder abuse, which shares some characteristics of spouse abuse and child abuse, affects one of the most vulnerable segments of our population. Typically, elder abuse and neglect are hidden from view, with less than 20% of cases identified by professionals. Health care and social service professionals—as well as family members, neighbors, and friends—need to be more alert to the possibility of abuse or neglect. They particularly need to be alert for self-neglect, especially in the case of frail elders aged 75 years and older who live alone and have little or no family or social support.

The medical community is increasingly aware of the impact of abuse and neglect. Because of this, medical organizations are trying to heighten doctors' awareness of elder mistreatment. In 1992 the AMA issued guidelines recommending that doctors ask all older adults about abuse and neglect.[1] The Joint Commission for Accreditation of Healthcare Organizations (JCAHO) has mandated improved identification and management of elder mistreatment, but the medical community's attention to elder mistreatment still lags far behind that devoted to child mistreatment, and there is still little clinical research by doctors on this important public health problem.

Why Doctors Need to Know About Elder Abuse

Mistreated elders can be extremely complex and time-consuming patients, but for many reasons clinicians should be in the forefront of identification and intervention. These patients are often isolated and may be seen outside the home only in a doctor's office or hospital. Home visits, when possible, can reveal a great deal about the elder's home situation and care. Patients usually trust doctors and nurses as custodians of confidential information and may be ready to divulge relevant information. With access to information that can alert them to the presence of risk factors, doctors can detect signs of physical abuse and neglect. In addition, medical records can provide legal evidence of mistreatment.

Unfortunately, most doctors have had little training about and often feel unprepared to deal with abused patients. Only 19% of surveyed accredited residency programs in Virginia covered elder mistreatment in their curricula.[2] Fewer than half of surveyed emergency doctors felt confident in identifying victims of elder mistreatment.[3] Thus it is no surprise that doctors report only a small percentage of the cases investigated by state agencies. In Michigan, mandatory reporting of elder mistreatment by doctors became law in 1985; between 1989 and 1993, 27,371 cases were reported: 41% by citizens, 26% by nurses, 18% by social workers, and only 2% by doctors.[4]

In addition to lack of training, there are other barriers to reporting abuse. These include the lack of valid and reliable screening tools for detecting abuse and neglect in clinical settings, fear of and lack of knowledge about legal ramifications, and time constraints. In this article we provide basic information about epidemiology, risk factors, assessment, and treatment of elder abuse and neglect which may help improve doctors' ability to assess their elderly patients.

Definitions

Elder mistreatment is destructive behavior—intentional or unintentional—directed toward an older adult and occurring within the context of a trusting relationship. It is of sufficient intensity and frequency to produce physical, psychological, social, or financial effects (suffering, injury, pain,

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loss or violation of human rights). It consists of acts of commission (abuse) and acts of omission (neglect) committed by people in close personal relationships with elders (relatives, friends, neighbors, significant others) or by individuals in formal relationships (healthcare workers, legal and financial advisors, landlords, and social workers).

Abuse consists of aggressive or invasive behaviors, actions, or threats that harm the patient. It may take any of the following forms:

- *Physical abuse*: physical force such as hitting, kicking, slapping, raping, burning, pushing, forced feeding, inappropriate use of restraints, beating, and drugs used against the elder's wishes. (Sexual abuse falls into this category.)

- *Psychological abuse*: verbal force used to coerce, threaten, intimidate, infantilize, belittle, or demean an elder.

- *Social abuse*: interdicting the social needs of an elder by unreasonable confinement, forced isolation, or preventing family or friends from visiting.

- *Financial abuse:* theft or misuse of an elder's money, property, or other assets.[5]

Neglect is the failure of responsible parties to appropriately ensure that an older adult's basic physical, psychological, social and financial needs are met. It includes the following:

- *Physical neglect*: failure to provide appropriate assistance needed for basic physical activities such as eating, walking, taking medicines, bathing, or turning in bed. It also includes not providing transportation to appointments or stores, not providing proper pain relief, or leaving a demented elder home alone all day.

- *Psychological neglect:* failure to provide emotional assistance or support; failure to meet an elder's basic emotional needs; excluding elders from decisions about their own care; ignoring their grief, fears, or concerns; failing to answer a call bell promptly; and ignoring or not visiting them.

- *Social neglect:* failure to provide means to meet basic social needs, including not taking an elder to visit friends or not allowing friends to visit, excluding the elder from family activities, confining the elder to a single room, not providing meaningful social activities for nursing home residents.

- *Financial neglect:* failure to meet basic material needs (for money, food, medicines, clothing, shelter or supplies).[5]

Several types of mistreatment can occur simultaneously. Neglect and self-neglect are reported most often, but it is not yet known that these are truly the most prevalent forms of mistreatment, since so much of elder mistreatment remains unreported and hidden from view.

Incidence and Prevalence

Methodological difficulties have impaired our understanding of this problem. Inconsistent definitions of what constitutes abuse and neglect, incomplete or inadequate data collection, and inconsistent sampling have made reliable data elusive. All studies indicate that most cases go unreported in spite of mandatory reporting laws in all 50 states, so we can only estimate the true incidence and prevalence of elder mistreatment; nevertheless, three studies provide some indication of the prevalence of elder abuse and neglect.

In a random sample of community-dwelling elders in Boston, Pillemer and Finkelhor[6] estimated that over 3% of the elderly are physically or psychologically abused or neglected by their caregivers (financial abuse and self-neglect were not included.) Despite the state's mandatory reporting law, only one in every 14 cases came to professional attention. In North Carolina, a random sample of 7 counties found that 7.5% of elders had been physically, psychologically, socially, or financially abused after reaching 65 years of age.[7,8] We can assume that including neglect or self-neglect would make the prevalence higher.

> "All studies indicate that most cases go unreported in spite of mandatory reporting laws in all 50 states . . ."

The National Elder Abuse Incidence Study was carried out in 1996 as part of the Family Violence Prevention and Services act of 1992.[9] Adult Protective Services from 20 counties in 15 states reported and authenticated the incidence of physical, sexual, psychological, and financial abuse, and of neglect (including abandonment and self-neglect); unreported cases were identified by over 1100 "sentinel" reporters. The sentinels, recruited from the ranks of home health providers, law enforcement, banks, and senior citizen centers and others likely to have contact with elders, were trained in identification of elder mistreatment. The data, collected in staggered 2-month periods over one year, imply (with wide confidence limits) that in 1996 more than 500,000 US adults over age 60 and living at home (institutional mistreatment was not included) were abused or neglected. Several trends were observed. For every reported case, approximately 5 went unreported. Of the 70,943 reported and substantiated cases of abuse and neglect, 20% were referred by family members, 17% by hospital personnel, 11% by law enforcement officers, and only 8% by doctors or other health personnel. Women were disproportionately represented in all categories except for abandonment. Self-neglect (44,168 cases) and neglect (34,525) were the types of mistreatment reported most frequently, followed by emotional abuse (25,142), financial abuse (21,427) and physical abuse (18,144).

Risk Factors for Elder Mistreatment

The earliest attempts to create a profile of victims and perpetrators of elder mistreatment used nonrandom, convenience samples without comparison groups. This depicted the typical abused person as a very old, disabled and dependent woman, mistreated by her adult children. The use of

Table 1. AMA guidelines for questioning older adults about abuse and neglect[1]

- Has anyone at home ever hurt you?
- Has anyone ever touched you without your consent?
- Has anyone ever made you do things that you didn't want to?
- Has anyone ever taken anything of yours without asking?
- Has anyone ever scolded or threatened you?
- Have you ever signed any documents that you didn't understand?
- Are you afraid of anyone at home?
- Are you alone a lot?
- Has anyone ever failed to help you take care of yourself when you needed help?

Table 2. Strategies for conducting an interview

Interviewing the patient
- Ensure privacy
- Ensure confidentiality
- Separate victims and caregivers
- Progress from general to specific questions
- Allow time to respond
- Respect cultural differences
- Do not blame the victim
- Do not confront the perpetrator
- Determine whether there is cognitive impairment

Interviewing the caregiver
- Avoid accusations
- Ask about support structure, resources and assistance
- Identify Adult Protective Services as support agencies
- Ask family members how caregiving has changed their lives: pros and cons
- Ask what assistance would improve the situation for them

random samples of elders and of comparison groups revealed other characteristics. Victims were often depressed, socially isolated, and in poor health.[6,10-15] Perpetrators were typically men, a spouse or first-degree relative of the victim, and themselves suffering from alcohol abuse, ill health, depression, and dependence on the victim. They used dogmatic care techniques based on high and rigid standards, had a negative perception of the elder, a history of deviant behavior, and a high level of external stress during the preceding year.[6,10-15] These findings shifted the focus of potential causes and contributing factors from the victim's characteristics to those of the perpetrator.

In eight studies, four distinct patterns have been found to be associated with specific types of elder abuse or neglect. Victims of physical and psychological elder abuse (either men or women) are likely to be relatively young (65 to 74 years of age) rather than very old (85 years and older), married, physically independent but in poor emotional health with low morale, in troubled marriages, living with others, lacking confidants, and socially isolated. The perpetrators of abuse tended to be spouses who themselves suffered from mental illness or mental problems, alcohol abuse, or a recent decline in mental or physical health; who were dependent on and living with the victim; and who had experienced recent stress. The characteristics of the perpetrator and the quality of the relationship between abuser and victim were more related to the abuse than were any characteristics of the victims, but the victims had few resources for dealing with abuse.[16-23]

Cases of financial abuse showed different characteristics: victims tended to be unmarried (widowed, divorced, or never married) older women or men who lived alone and had problems with money management and transportation. They lacked adequate social support or personal confidants. A combination of health problems, poor morale, and depression limited their activities. The perpetrators of financial abuse tended to be younger, distantly related or unrelated individuals who themselves abused alcohol and had physical or emotional problems. They did not live with the victims but were financially dependent on them. The victims' characteristics made them vulnerable to perpetrators because they could not function independently.[16-23]

A limited picture of sexual elder abuse emerges from one study of 28 cases with no comparison group.[24] All victims were women who were either totally dependent or had significantly impaired functional status; 81% of the perpetrators were caregivers for the victim, and 78% were sons or husbands (the rest were brothers, boarders, unrelated caregivers, friends, or distant relatives[24]). This form of elder abuse needs much more investigation.

In elder abuse, perpetrator characteristics dominate, but in elder neglect, victims' characteristics seem more relevant. Neglect victims are likely to be very old, widowed, disabled women whose poor health and physical or mental impairment make them dependent on caregivers. They often live with the person who neglects them and have sparse social networks. The perpetrators are family members or unrelated caregivers, many of whom have experienced losses in their own support systems. They view caring for the elder as a source of stress.[16-20]

Clinical Assessment

No early intervention studies have yet been conducted, but theory supports the idea that early identification of persons at risk will lessen mistreatment. Both domestic and institutional forms of elder abuse and neglect tend to occur in repetitive cycles, and to escalate in intensity. Identification would allow an intervention to be based on the characteristics of the individual case and the resources available in the community (social programs; home health nurses and aides; respite care treatment; removal of the perpetrator; or placement of the elder in an adult care home, assisted living or nursing home).

It is important to have information about the health, functional abilities, mental capacity, social and economic resources and living situation of elders. This information may be acquired over several interviews and by several members of the clinical staff; it can be collected in the elder's home by a doctor, nurse, or social service provider. It is important to recognize that cognitive impairment does not automatically make a patient unable to understand or describe mistreatment; it depends on the degree of impairment exhibited by the elder. Specific steps are recommended in interviewing patients and caregivers about elder mistreatment.[25]

The AMA has provided a list of interview questions designed to uncover the various types of mistreatment (Table 1). They provide a framework for questioning, but work best when adapted to the specific situation and provider. It is important that the elder be interviewed alone, without any family members or caregivers in the examining room (Table 2). Any positive response requires a more detailed exploration of how, when, what, and who has been involved—that is, the complete details of the situation.

There are many reasons why patients do not disclose instances of abuse and neglect. The patient may not be able to report the problem because of cognitive impairment or aphasia, or may not recognize the behavior of the caregiver as abusive or neglectful, or may feel guilty about "provoking" the abusive behavior. The patient may not recognize symptoms of depression or anxiety. He may feel shame or guilt, or be protective of his abuser, especially if it is a family member. Alternatively, elders may recognize abuse or neglect but are hesitant to admit it because of fear that the perpetrator will retaliate and the mistreatment will become worse. This is a legitimate fear and all clinicians must be sensitive to it. Sometimes, elders fear nursing home placement. It is here that the clinician can be especially helpful, educating the patient about the problem, the options available, and how service agencies can be supportive.

Similar care must be taken in interviewing the caregiver, who should also be interviewed in private away from the elder. It is best if the clinician views the elder and the alleged perpetrator as "good" people caught in a "bad" situation, and as both needing help. Table 2 suggests guidelines for interviewing family members and caregivers.

The physical exam can provide important clues about possible mistreatment. Approach the elder slowly and notice whether he or she flinches, withdraws or grimaces as you approach and begin the examination. Note any body language that could indicate fear or anxiety. Note all injuries, especially multiple injuries in different stages of healing, and unexplained injuries or those with implausible explanations. Evidence of malnutrition or dehydration, poor hygiene, absence of needed assistive devices (dentures, eyeglasses, and canes) should be noted and the issue of neglect considered. Evidence of medical noncompliance such as frequently missed appointments, low therapeutic drug levels, and multiple exacerbations of chronic medical problems may point to neglect.[26] It is important to remember that failure to assess the elder and caregiver separately may not only lead to missing the diagnosis of abuse or neglect but also lead to erroneous explanations (and, therefore, mismanagement) of injuries or medical symptoms. Doctors should report all suspected cases of elder abuse or neglect to the Adult Protective Services (APS) worker in the county in which the elder resides. These workers must, by law, investigate any suspected mistreatment and offer intervention. It is important that doctors work with APS workers to resolve any mistreatment.

Intervening

Whenever mistreatment is identified or suspected, the first priority is to ensure the patient's safety. If there is evidence of serious injury or life-threatening neglect, or if physical attacks have occurred or accelerated in frequency or severity, the options are to shelter the patient, obtain court protective orders, or hospitalize. The doctor can assist the APS worker in implementing the plans for treatment. If the patient is competent and wants to continue the living situation, the doctor should be supportive while being sure that the elder is fully aware of the risks involved. The patient should be taught about abuse and neglect, and provided with access to available resources. The legal requirement to report mistreatment should be discussed, and follow-up care arranged.

Elder Abuse and the Law

All 50 states have laws mandating that elder abuse be reported. In North Carolina, reporting of elder mistreatment became mandatory in 1979, and any person "who has reasonable cause to believe that a disabled person is in need of protective services" (NCGS108A-102; Table 3) must report suspected mistreatment to Adult Protective Services. These

Table 3. Duty to report abuse; content of report; immunity from legal action*

- Any person having reasonable cause to believe that a disabled adult is in need of protective services shall report such information to the director.
- The report may be made orally or in writing. The report shall include the name and address of the disabled adult; the name and address of the disabled adult's caretaker; the age of the disabled adult; the nature and extent of the disabled adult's injury or condition resulting from the abuse; and other pertinent information.
- Anyone who makes a report pursuant to this statute, who testifies in any judicial proceeding arising from the report, or who participates in a required evaluation shall be immune from any civil or criminal liability on account of such report or testimony or participation, unless such person acted in bad faith or with a malicious purpose.

*North Carolina General Statute 108A-102

Table 4. North Carolina resources for elders

CARE-LINE:	Office of Citizen Services 800/662-7030; 919 733-4261	Information, referrals, inquiries, reports of mistreatment
NC Division of Aging:	919 733-3983 www.dhhs.state.nc.us/aging	Nutrition, adult day care, in-home aides, group respite, legal, home health, transportation
Area Agencies on Aging:	www.dhhs.state.nc.us/aging/aaalist.htm	

Region A	828/488-9211	Cherokee, Clay, Graham, Haywood, Jackson, Macon, Swain
Region B:	828 251-6622	Buncombe, Henderson, Madison, Transylvania
Region C:	828 287-2281	Cleveland, McDowell, Polk, Rutherford
Region D:	828 265-5434	Alleghany, Ashe, Avery, Mitchell, Watauga, Wilkes, Yancey
Region E:	828 322-9191	Alexander, Burke, Caldwell, Catawba
Region F:	704 372-2416	Cabarrus, Gaston, Iredell, Lincoln, Mecklenburg, Rowan, Stanly, Union
Region G:	336 294-4950	Alamance, Caswell, Davidson, Guilford, Randolph, Rockingham
Region H:	910 895-6306	Anson, Montgomery, Moore, Richmond
Region I:	336 761-2111	Davie, Forsyth, Stokes, Surry, Yadkin
Region J:	919 549-0551	Chatham, Durham, Johnston, Lee, Orange, Wake
Region K:	252 436-2040	Franklin, Granville, Person, Vance, Warren
Region L:	252 446-0411	Edgecombe, Halifax, Nash, Northhampton, Wilson
Region M:	910 323-4191	Cumberland, Harnett, Sampson
Region N:	910 618-5533	Bladen, Hoke, Robeson, Scotland
Region O:	910 395-2684	Brunswick, Columbus, New Hanover, Pender
Region P:	252 638-3183	Carteret, Craven, Duplin, Greene, Jones, Lenoir, Onslow, Pamlico, Wayne
Region Q:	252 946-8043	Beaufort, Bertie, Hertford, Martin, Pitt
Region R:	252 426-5733	Camden, Chowan, Currituck, Dare, Gates, Hyde, Pasquotank, Perquimans, Tyrrell, Washington

state-funded agencies will investigate reports, provide emergency services, counseling and protective relocation. A disabled person is defined as any person over the age of 18, who is incapacitated by physical or mental impairment. Adults in need of protective services are those unable to care for themselves, those lacking help, and those experiencing abuse, neglect or exploitation. Persons who report their suspicions in good faith are protected by the law from civil or criminal liability. Only a reasonable suspicion of mistreatment is required, not actual proof. In North Carolina about 1500 cases a year are reported to Adult Protective Services. Most involve neglect by a caretaker or self-neglect.

Controversy surrounds mandatory reporting laws. Research has not yet shown whether such laws improve the status of mistreated elders. At times, the laws come in conflict with patient-doctor confidentiality, as when the patient requests that no report be made. In such situations, the law supersedes the ethical issue of doctor-patient confidentiality, but the elder's safety and well-being must be the first priority. Therefore, the best approach needs to be determined on a case-by-case basis. The doctor should explain the legal obligation in a way that emphasizes the helping rather than punitive role of service agencies. In the end, the patient and family are less likely to feel threatened when interventions are arranged by the doctor in conjunction with the APS worker. Most families welcome offers of assistance such as home health services or respite care (Table 4).

There have been very few reports about what follows agency intervention in cases of elder abuse or neglect. One study of a volunteer-staffed advocacy program for abused elders reported improved access to services, decreased isolation, improved self-esteem, and increased likelihood of legal action.[27] This study was not randomized, involved a small number of clients, and failed to reach statistical significance. This area clearly deserves more study.

Conclusions

In addition to the obvious physical and emotional harm inflicted on mistreated elders, the medical consequences of abuse and neglect are far-reaching. One study found higher mortality rates for abused and neglected elders than for a comparison group of comparable age, with comparable medical conditions, cognitive or functional impairment, and social networks. None of the deaths in this study were attributed directly to injuries.[28]

The medical community has a clear obligation to intercede in the care of its mistreated elderly patients. Proper assessment may improve identification of such patients, and hopefully improve their medical care as well as their quality of life.

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Manuscript Preparation

Prepare papers according to the "Uniform Requirements for Manuscripts Submitted to Biomedical Journals" (N Engl J Med 1991;324:424-8) with the following exceptions: 1) no abstract is needed; 2) no running title is needed; and 3) report measurements in metric units; use of the International System of Units (SI) is optional.

Submit a cover letter and a 3 1/2-inch computer disk that contains the text written in MS DOS- or Macintosh-compatible format. *Also enclose three hard copies of the text for review purposes.* Double space text with one-inch margins. *Please do not "format" the text* (e.g. no variations in type size, no bold face, no italics, no embedded endnotes).

Submit photographic illustrations, in duplicate, as high-quality color 35mm slides or 5-by-7 or 8-by-10-inch glossy prints, or as black-and-white glossy prints (5-by-7 or 8-by-10-inch). Label all illustrations with author's name, number them sequentially according to their position in the text, and indicate the orientation of the images, if necessary. *Do not write directly on the backs of prints.* This can damage them. If figures require printing in four-color process, we may ask the author to pay printing fees or a portion thereof.

Submit tables, charts, and graphs as hard copy *and* include copies on disk, in their original format *and translated as TIFF, PICT, or EPS documents.* Type all figure legends separately. Type and double-space all tables, one to a single sheet of paper. Tables must have titles and consecutive Arabic numbers.

Keep references to a minimum (preferably no more than 15), retaining those that document important points. The "Uniform Requirements" cited above contain reference format. We customarily list the first three authors for "et al"-type references. Authors are responsible for the accuracy and pertinence of all citations.

Avoid abbreviations entirely if possible; keep them to a minimum if not. When used, completely define abbreviations at the first point of usage in the text.

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CME Calendar

(1) September 22-24 (2) December 10-12
Emergency Ultrasound Course
Place: (1) Charlotte, NC; (2) Columbia, SC
Credit: Up to 21 hours, Category 1, AMA; 21 hours, Category 1, ACEP
Fees: $700 physicians; $650 ACEP; $600 SCCEP; $500 residents and PAs; $450 students
Info: South Carolina College of Emergency Medicine; Thomas D. Cook, MD, 145 Sassafras Tr., Lexington, SC; *email*: huntpat@sc.rr.com; *website*: www.emergencyultrasound.com

September 22-23
Wound Management 2000
Place: Friday Center, UNC-Chapel Hill
Credit: Up to 10.5 hours, Category 1, AMA; 12 hours ANCC contact hours
Fees: Registration before 8/26: $165 physicians, $75 nonphysicians; after 8/26: $185/$85
Info: Sponsored by UNC-Chapel Schools of Medicine and Nursing. 919/962-2118; fax 962-1664. *Registration deadline September 13.*

October 12-14
World Foundation for Medical Studies in Female Health CME Conference
Place: Inter-Continental Hotel, New Orleans
Credit: TBA
Fees: $450 physicians; $350 all others
Info: 516/944-3192.

October 13
Sixth Annual George T. Wolff, MD, Primary Care Symposium
Place: Moses H. Cone Memorial Hospital, Greensboro
Credit: Up to 6 hours Category 1, AMA and AAFP Prescribed
Fee: $50
Info: Greensboro AHEC, 336/832-8214; email: pam.reavis@mosescone.com

October 14-15
27th Postgraduate Course, The Alexander Spock Symposium: Practical Management of Common Problems in Ambulatory Pediatric Patients
Place: Searle Center for Continuing Medical Education, Duke University Medical Center, Durham
Credit: TBA
Fees: $150 physicians (both days); $90 allied health professionals; free for in training or emeritus
Info: J. Mark Majure, MD 919/684-2289

October 20-21
2000 Coastal Medical Retreat
Place: Holiday Inn SunSpree Resort, Wrightsville Beach
Credit: 6.5 hours, Category 1 AMA
Fees: $150 (includes dinner dance); $35 admission to dinner dance only, for physicians, spouses, guests
Info: Sponsored by UNC-Chapel Hill School of Medicine; golf and tennis tournaments, boat fishing on 10/20; full day of CME, dinner-dance on 10/21. Contact Bonnie Brown at New Hanover-Pender Co. Medical Society: tel. 910/790-5800; *email* nhpcmeds@wilmington.net

October 25-27
The 27th Annual Edward W. Hook, Jr., MD, Recent Advances in Clinical Medicine
Place: Omni Hotel, Charlottesville, VA
Credit: TBA
Fees: TBA
Info: Camilla Turnage, University of Virginia Office of CME, at 800/243-5703 or 800/552-3723; or www.med.virginia.edu/ed-programs/cme/racm

December 12-13
The Great Divide: Understanding and Eliminating Health Disparities
Place: Sheraton Capital Center, Raleigh
Credit: TBA
Fees: TBA
Info: UNC School of Public Health, 919/966-4032; or www.sph.unc.edu/oce

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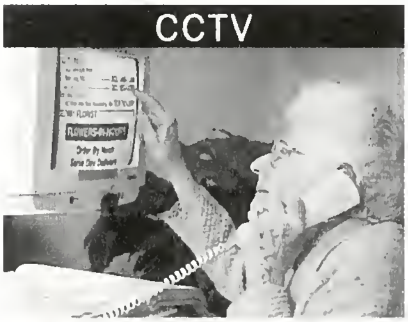

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Speaking of Medicine

Doctors as Writers

I suspect the descriptive processes [doctors] have to go through, both themselves and presumably with their patients, are extremely good verbal training, and I do not think it is an accident that the one thing the medical profession has done, apart from producing doctors, is to produce writers. —*Charles Percy Snow*

Medicine and writing go well together, they shed light on each other and both do better by going hand in hand. A doctor possessed of the writer's art will be the better consoler to anyone rolling in agony; conversely, a writer who understands the life of the body, its powers and its pains, its fluids and functions, its blessings and banes, has a great advantage over him who knows nothing of such things.
—*Thomas Mann*

A medical paper should be like a lady's dress—short enough to be interesting but long enough to cover the subject. —*Anonymous*

Authorship cannot be conferred; it may be undertaken by one who will shoulder the responsibility that goes with it. —*Richard M. Hewitt*

You never use the word 'unique' in anything that you publish, because you always regret it later on—there is no such thing as unique.
—*Heinz Edgar Lehmann, Gordon E. Hanrahan*

Why did you start, what did you do, what answer did you get, and what does it mean anyway? This [seems to me to be] a logical order for a scientific paper.
—*Austin Bradford Hill*

The prayer of the scientist if he prayed, which is not likely: Lord, grant that my discovery may increase knowledge and help other men. Failing that, Lord, grant that it will not lead to man's destruction. Failing that, Lord, grant that my article in *Brain* be published before the destruction takes place.
—*Walker Percy*

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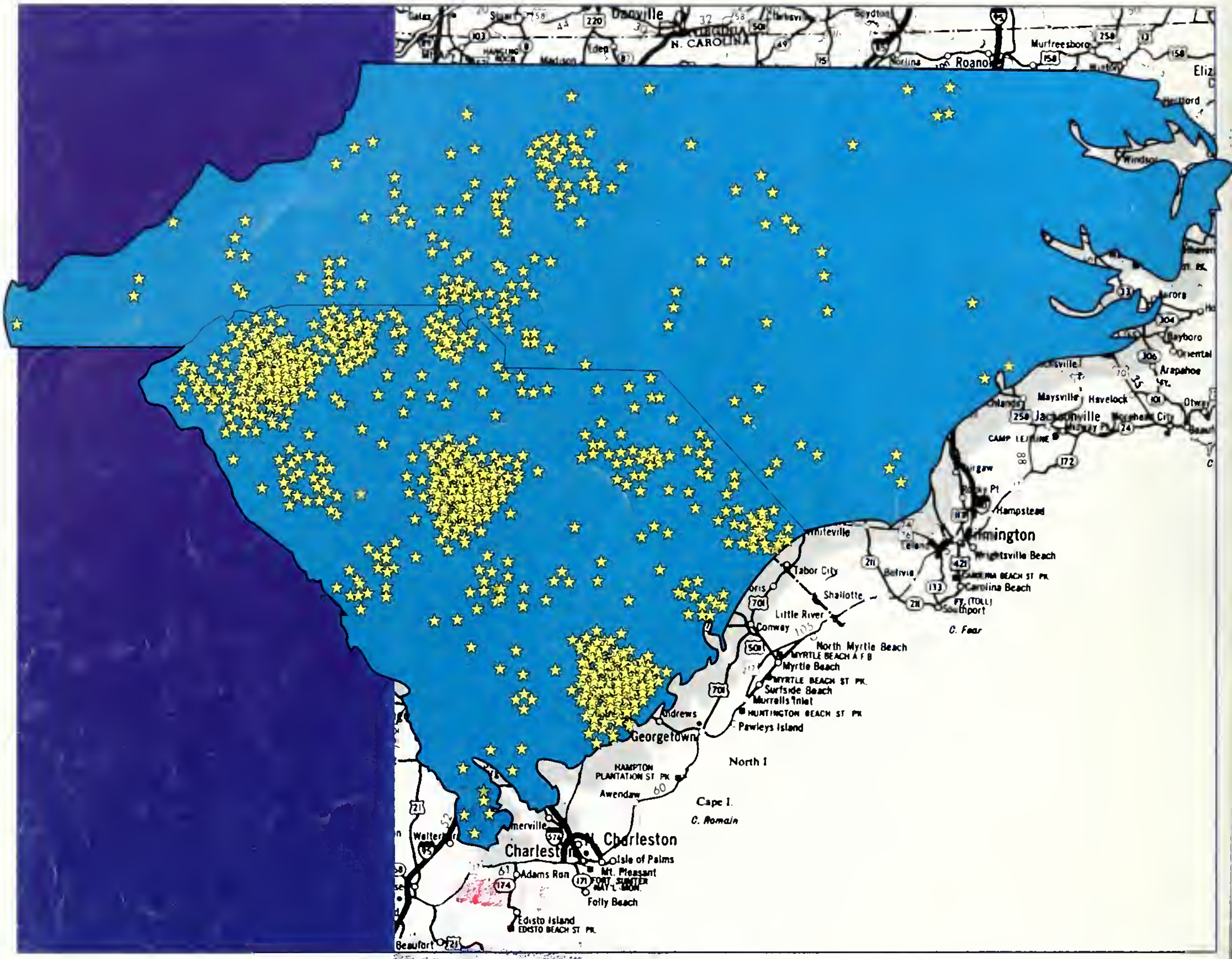

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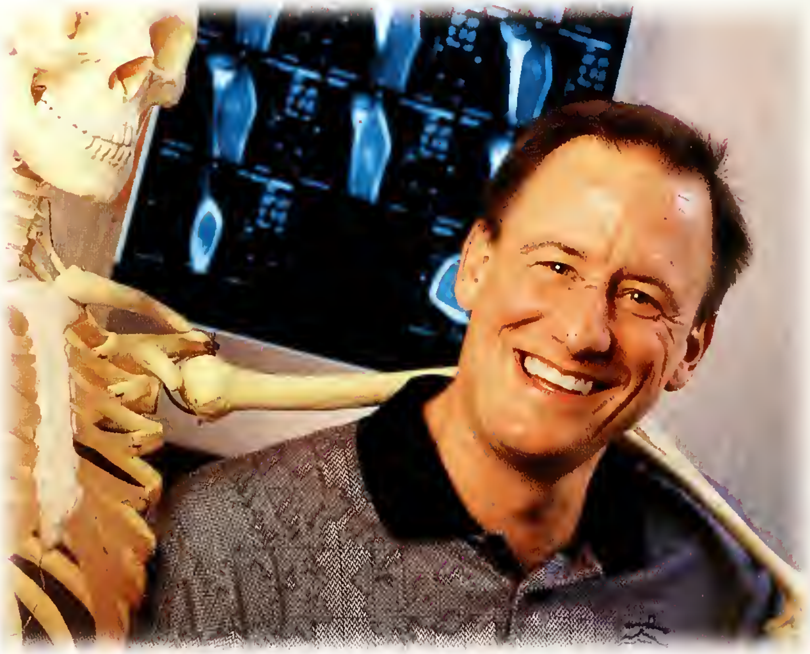

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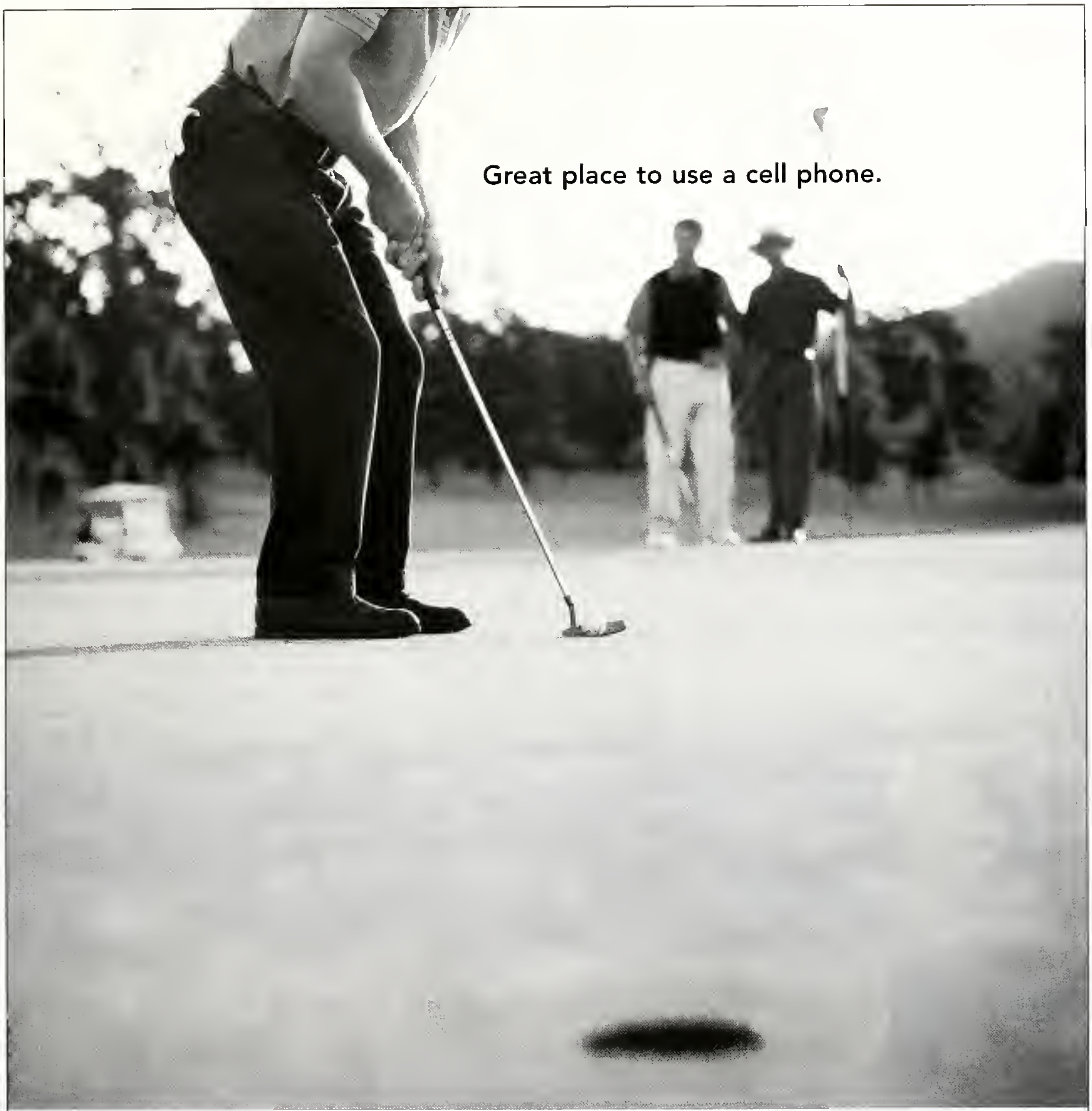
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North Carolina Medical Journal

FOR DOCTORS AND THEIR PATIENTS

November/December 2000, Volume 61, Number 6

Cover: Female adult *Ixodes scapularis* tick, also known as *Ixodes dammini*, common vector for Lyme disease. Photograph by Jim Gathany, courtesy of the Centers for Disease Control and Prevention.

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Letters to the Editor

NC Med J—Linking Colleagues, Patients, and Professional Ideals

To the Editor:

Whether or not to support the *NC Medical Journal* is a crucial question for the membership of the NC Medical Society. The answer for each and every member of the society depends on other questions. "Who am I?" "Who do I wish to become?" "How do I wish to be perceived?"

How do these questions play out for you? Are you a well-schooled tradesman, a member of the guild? That is an honorable endeavor and, if done honestly, may provide a good living. For you, an instrument such as the *North Carolina Medical Journal* may be absolutely useless. Your nurse can fill in software templates designed by someone else; you can click on other software for a list of likely diagnoses, ranked according to the answers in the first program; you can dispense the latest nostrums touted by the charming pharmaceutical representative. You may do no harm, and you may occasionally be helpful. You can then go home to your spouse and children and be a good companion and a good parent. You can do all of these fine things without the *Journal.*

If, however, your medical school education was just the beginning of a journey you want to continue, then you need the *Journal.* If you find that learning moves you to new vistas, to what next there is to learn, you have found that the edge of knowledge can be a scary place. We need connections with colleagues who are also at that edge. Other journals, the Internet, other tools can make those connections. But the *North Carolina Medical Journal* has historically been—and should continue to be—an important link with the colleagues in our own neighborhood. That neighborhood, the state's medical community, grows steadily larger and more complex. The *Journal* reaches out to it through the base of our Medical Society and speaks volumes about who we are, and how we want to be perceived: as professionals, doctors, teachers. We should be seen as constantly striving to connect to truth in place of conventional wisdom, to connect to our patients, and to our own souls. The *Journal* should represent the heart and soul of the NC Medical Society. Each of us will have to search our heart and soul and decide whether the absence of the *Journal* would represent what we are not.

John R. Dykers, Jr., MD
PO Box 565
Siler City, NC 27344

From the Editor: See the Editorial on page 315.

Never Underestimate the Capacity for Miscommunication

To the Editor:

Know what you tell your patient, AND THEN, more importantly, know what your patient heard!

Recently, as we were waiting on a major Raleigh thoroughfare for a stoplight to change, a car pulled up beside us. The driver appeared to be about a 65-year-old, white-haired woman. Her torso was listing to the right at about a 45-degree angle. She could just see over the dashboard. Her left foot, clad in an orthopedic shoe, rested on top of the dashboard to the left of the steering wheel.

I'm sure that her physician meant, Keep your foot elevated higher than your heart WHEN PRACTICAL—not whenever possible!

Bruce B. Blackmon, MD
PO Box 8
Buies Creek, NC 27506

Alcohol Missing in Discussions of Domestic Violence

To the Editor:

The bulk of the September/October issue of the *Journal,* deals with domestic violence, and it is surprising that almost no mention is made of the effect of alcohol. Although one cannot get the figures on this, since most of the perpetrators of the violence do not come to the emergency room and thus cannot be checked for alcohol, I am sure that about 80% of all domestic violence, including homicides and infant injuries, are alcohol-related. Only one article, by Gilliland, Spence, and Spence, really mentions it.

Eben Alexander, Jr., MD
Department of Neurosurgery
Wake Forest University Baptist Medical Center
Winston-Salem, NC 27157-1029

History of Medicine Articles—An Important Part of the Journal

To the Editor:

Dr. Halperin's article on Francis Henry Williams, MD, "A Completely Efficient Life" [NC Med J 2000;61(4):199-202], is most interesting. A beautiful essay.

The history of medicine is something we all need. I hope the NCMJ can continue in existence. It would be nice to have a historical article in every issue. May I congratulate you on the splendid job you continue to do.

H. Max Schiebel, MD
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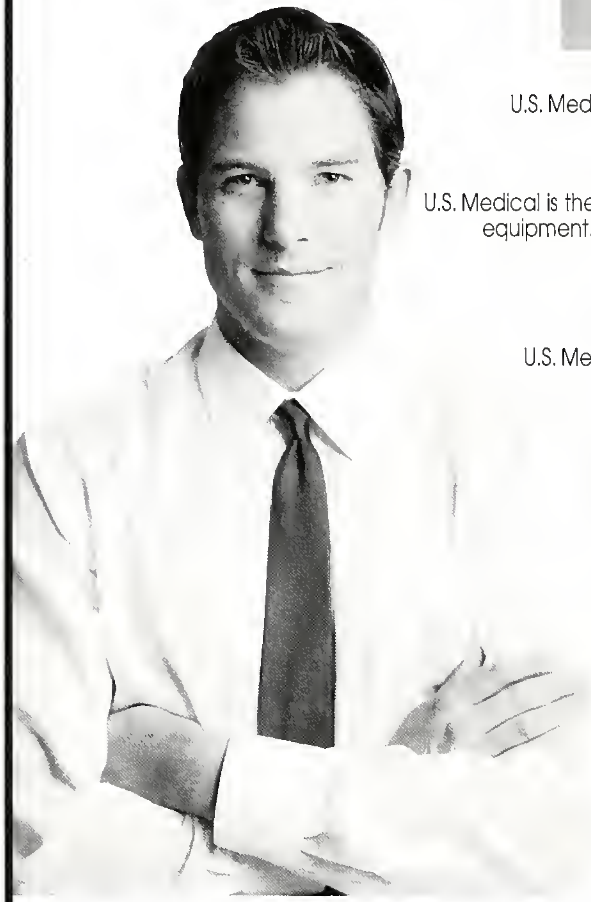

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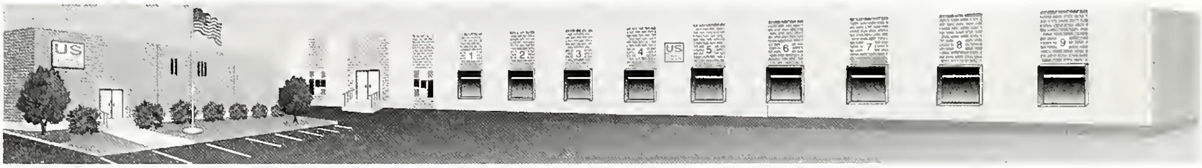

The Votes: In
The Results: Good
The Work: Still Before Us

In July and August, as most of you know, the Medical Society conducted a mail survey of its members about the status of the *North Carolina Medical Journal.* This survey was simple and turned on a single major question: "Should the North Carolina Medical Society continue to publish the *North Carolina Medical Journal*?" The responses are in and tabulated, and there is much to be proud of in the results.

The questionnaire went to 10,187 people; 3,098 usable responses were returned by the August 18 deadline. This response rate of over 30% is nearly three times larger than any previous response rate to a NC Medical Society mail survey. We are deeply gratified that so many members took the time to respond.

This response rate is considered to be an excellent one, especially since this was not a random survey and there was no follow-up contact to cajole responses. The data were analyzed by Ruth Monnig, Director of Development, Information & Library Sciences, at UNC-Chapel Hill. She suggested that we view the results as if the survey were an election: Every member was given the opportunity to participate, and failure to participate cannot be construed as either a positive or a negative vote.

The final tally showed that 59.4% of respondents voted in favor of continuing publication of the *Journal*, and 40.6% voted against. The percentages were highly consistent across ages of respondents, geographical locations, and specialties. Here in the *Journal* office we do look at this as an election, and as the participants in our own recent national election would be quick to point out, a 60/40 division represents an unequivocal victory. We are pleased that so many of our fellow Society members elected to stand in our corner.

Another item in the survey asked about how *Journal* publication should be funded. Nearly three-quarters of those in support of the *Journal* thought that a portion of membership dues should—as was the case from 1939 to 1999—underwrite the *Journal.* That is not a tenable option, given the present budget constraints faced by the Society's leaders. Therefore we have to fall back on the second most popular option, which is that we solicit voluntary contributions. The *Journal* needs your help, today as in the past. We have a good and steady flow of articles germane to and appropriate for medical practitioners in North Carolina. We are recording and preserving the history of medical practice in this state and region. We are encouraging communication and response by students, Society members, and other interested parties. We have developed a new and highly attractive electronic format, making *Journal* articles available to a worldwide audience at www.ncmedicaljournal.com.

You can help sustain the *Journal*'s work by making a tax-deductible contribution in the name of the *Journal* to the North Carolina Medical Society Foundation, Box 27167, Raleigh 27611. Donated funds cannot be returned.

A number of Society members have made very generous contributions, some in the range of $1,000 to $10,000. Those of you in the fortunate position to make contributions of this magnitude could help build the *Journal* a permanent financial foundation. But we are most thankful for contributions of any size, since a multitude of smaller gifts can achieve the same end.

Thanks to you all, for your support past, present, and yet to come.

—Francis A. Neelon, MD, Editor

Running the Numbers

A Periodic Feature to Inform North Carolina Physicians and Their Patients
About Current Topics in Health Statistics

Paul A. Buescher, PhD, Editor

u

Improving the Completeness and Accuracy of Birth Defects Surveillance Data

Our last column described how the North Carolina Birth Defects Monitoring Program (BDMP) conducts surveillance of birth defects and related perinatal outcomes. These data are important for monitoring geographic and temporal trends in birth defects, for improving the delivery of services for children and families, for evaluating the effectiveness of interventions, and for conducting epidemiologic studies.

Specially trained BDMP field staff collect data through systematic review of medical records and linkage of databases such as hospital discharge data and vital records. This comprehensive approach obtains much more complete and accurate information than can be obtained from any single source. This is illustrated in the table below, which compares the number of cases of selected defects identified through the BDMP with the number reported on the birth certificate checkbox section for birth defects. As shown, the percentage of cases reported on birth certificates varies considerably by type of defect. Reporting completeness on the birth certificate ranged from 75% for anencephaly to 12.5% for microcephaly. Overall, birth certificate reporting was poor and—with the exception of anencephaly and spina bifida—was 50 % or less for all defects shown. Similar under-reporting on birth certificates has been observed in other states.

Selected Birth Defects Ascertained Through the Birth Defects Monitoring Program Versus Reported on the Birth Certificate, North Carolina Resident Live Births, 1997

Type of defect	**Number identified by NCBDMP**	**Number (%) reported on birth certificate**
Anencephaly	16	12 (75.0)
Spina bifida	56	33 (58.9)
Encephalocele	13	4 (30.8)
Microcephaly	64	8 (12.5)
Hydrocephalus	137	52 (38.0)
Tracheoesophageal fistula	48	22 (45.8)
Orofacial clefts	164	74 (45.1)
Anorectal stenosis/atresia	55	20 (36.4)
Renal agenesis	40	15 (37.5)
Diaphragmatic hernia	32	16 (50.0)
Down syndrome	121	44 (36.4)
Trisomy 13	14	3 (21.4)
Trisomy 18	19	9 (47.4)

In an effort to obtain more complete surveillance data, the BDMP monitors birth defects diagnosed in live-born infants up to one year old, as well as anomalies identified among fetal deaths. Recently, the BDMP has begun expanding ascertainment of neural tube defects (NTDs) to include pregnancy terminations and stillbirths less than 20 weeks gestation. This activity is part of a newly implemented Neural Tube Defect Surveillance and Prevention Program, which is funded by the CDC Division of Birth Defects and Pediatric Genetics. This expanded system, when fully in place, is expected to double the number of NTDs identified statewide, greatly aiding efforts by the Division of Public Health, and organizations such as the March of Dimes, to design, target, and evaluate the effectiveness of folic acid promotion activities in North Carolina.

For more information contact Dr. Robert Meyer at 919/715-4476 or robert.meyer@ncmail.net. The National Birth Defects Prevention Network web site (http://www.nbdpn.org) also has information and links to related sites.

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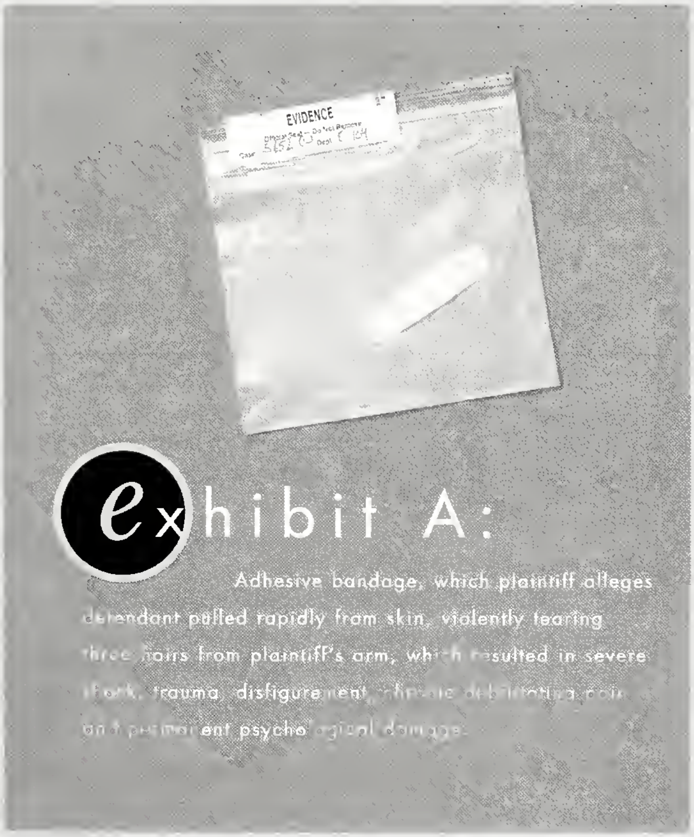
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Lyme Disease

Pitfalls in Diagnosis

John A. Crump, MBChB, DTM&H

Lyme disease produces a great deal of worry, but is very uncommon in North Carolina. This means that serological testing, except in patients who have had tick exposure in areas highly endemic for Lyme disease, and who have convincing clinical features, can produce misleading results.

Clinical

Lyme disease is a highly variable, multi-system infectious disease. It is usually transmitted to humans by the bite of an infected tick vector. Mother-to-infant transmission has occasionally been documented.[1] Most of the clinical features of Lyme disease were described in European patients in the early 1900s,[1] but only in the mid-1970s did a group at Yale, investigating a cluster of 'juvenile arthritis' in New England, tie all the clinical elements together[2] and find the association with a novel, tick-borne microorganism later to be named *Borrelia burgdorferi*.[3] It is now known that spirochetes of the *B. burgdorferi* complex cause the disease. Three genospecies have been recognized, each causing disease in particular geographic regions: *B. burgdorferi sensu stricto* occurs in North America, *B. garinii* in Europe,[5] and *B. afzelii* in Asia.[6] Lyme disease has a variable incubation period, after which the course can be divided into stages.[2] The first stage, localized erythema migrans, occurs days to weeks after exposure. This is followed by dissemination, which occurs weeks to months after exposure. The third, and final stage of persistent infection occurs months to years after exposure. Manifestations of persistent infection can involve the musculoskeletal (arthritis), neurologic (radiculitis), and cardiovascular systems (atrioventricular block), as well as the skin.

Life Cycle of Borrelia

The animal reservoir hosts of Lyme disease are the white-footed mouse (*Peromyscus leucopus*)[7] and Norwegian rats (*Rattus norvegicus*).[8] The vectors that transmit Lyme disease are "hard" ticks of the *Ixodes ricinus* complex (*I. dammini, I scapularis, I. pacificus, I. ricinus, I. persulcatus, I. dentatus*).[9] The vector ticks are maintained as parasites on white-tailed deer.

The tick develops through three stages, over a two-year life span.[2] Ticks feed in late summer as larvae and the next year as nymphs in early spring and as adults in late summer. The larval or nymphal ticks are so small they may go unnoticed when they attach to humans; transmission of spirochetes from the saliva and hemolymph of infected ticks is enhanced when tick attachment persists for 24 hours or more.[10]

Epidemiology and Prevention of Lyme Disease

The geographic distribution of Lyme disease reflects the particular ecology that brings humans into contact with the rodent-tick-deer life cycle. In the US, Lyme disease is found in the Northeast, North-Central, and West Coast regions, where annual incidence figures reach very high levels. In Connecticut, for example, there are more than 30 cases/100,000 population each year.[11] Lyme disease is rare in North Carolina (the reported incidence in 1998 was <1/100,000[11]), and most cases are imported. The disease is endemic in large tracts of the Northern Hemisphere, but it appears to be rare or absent from the Southern Hemisphere.[12]

Prevention of Lyme disease currently involves tick avoidance. A recombinant vaccine has been developed against outer surface protein A of *B. burgdorferi*.[13,14] It appears to offer only moderate protection, and regular booster doses may be necessary. The Centers for Disease Control and Prevention have recently issued guidelines for the use of Lyme disease vaccine.[15] Prophylactic antibiotic treatment of exposed but asymptomatic patients is not recommended.[16]

Dr. Crump is a Fellow of Medical Microbiology at Duke University Medical Center. He can be reached at Box 3879 DUMC, Durham 27705; 919/681-4482.

Laboratory Diagnosis

It is often difficult to establish a diagnosis of Lyme disease. A careful consideration of the clinical picture, supplemented by serological testing, is necessary. Only patients with a suggestive clinical syndrome and appropriate exposure history should be tested.

Enzyme-linked immunosorbent assay (ELISA) is the serological testing method most commonly used. In early disease, the sensitivity (likelihood that an infected patient will have a positive test) of serum assays ranges from 40-80%, but rises to 90-100% in late disease. Specificity (likelihood that an uninfected patient will have a negative test) ranges from 90-94% in early disease to 70-90% in late disease. There are no sensitivity or specificity data for ELISA assays of cerebrospinal fluid. Indirect immunofluorescence assays can, under ideal conditions, achieve sensitivity and specificity similar to ELISA, but they are subject to more inter-laboratory and inter-test variation, so these tests should be limited to laboratories with large test volumes.[17] Western blot testing is used to confirm indeterminate and positive ELISA results.

Culture of *B. burgdorferi* is the laboratory gold standard in diagnosis, but it is only available in reference and research laboratory settings. A biopsy (or, less ideally, an aspirate) of the leading edge of an erythema migrans lesion gives the best yield. The specimen is cultured on special Barbour-Stoenner-Kelly medium (BSK II) at 34-37^{0}C in the dark for 2-3 weeks. Cultures are examined with dark-field microscopy (or silver impregnation staining) for the long, narrow spirochete. Species identification can be confirmed by immunofluorescence.[17] The molecular technique of polymerase chain reaction can detect *B. burgdorferi* DNA in blood, cerebrospinal fluid, joint fluid, and tissue, but there are few data on the reliability of the test.[17]

Antibiotic Susceptibility

Because *B. burgdorferi* is not routinely cultured, susceptibility testing is not performed. The organism is generally considered susceptible to the agents recommended as first line therapy for early disease (amoxicillin, doxycycline) and late disease (ceftriaxone).

Recommendations

Serological testing for Lyme disease should be restricted to patients with a high probability (greater than 20%) of having the disease. In other words, testing should be limited to patients with convincing symptoms and signs (not just arthralgia, myalgia, headache, fatigue, palpitations) and travel to an area known to be endemic for Lyme disease.[18] A patient who has never left North Carolina is very unlikely to have Lyme disease. Testing patients with low probability of disease leads to an unacceptable rate of false-positive results, in accordance with Bayes' theorum.[19] In appropriate cases, a single serum sample collected two weeks after disease onset should be submitted for Lyme serology. This may be adequate to make the diagnosis, but a second sample may be needed if the clinical syndrome suggests Lyme disease but the first test is negative.

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How Bone Density Testing Influenced Osteoporosis Treatment in a Community Hospital

Thomas J. Weber, MD, Jennifer B. Green, MD, Henry Chow, MD, Adam Spitz, MD, and Galen S. Wagner, MD

Osteoporosis is a major public health problem in this country. It leads to approximately 1.5 million fractures every year in the US, which cost the healthcare system about 14 billion dollars a year.[1,2] In North Carolina in 1997, there were nearly 13,000 hip fractures, which cost 57 million dollars. Over 1 million North Carolina women and men older than 50 are at risk for developing fractures because they have osteoporosis or low bone density.[3] Despite the high prevalence of osteoporosis, it is not possible to properly identify individuals with the condition using clinical risk factors alone.[4] Effective diagnosis of osteoporosis (and monitoring response to any treatment) must include measurement of bone mineral density (BMD). BMD is usually measured by dual energy x-ray absorptiometry (DEXA), a non-invasive, low-risk test that very accurately quantifies mineral density of spine and hip. Unfortunately, most patients at risk for osteoporosis are not being properly tested.[5,6]

NorthEast Medical Center (NEMC), a community-based hospital located in Concord, NC, has a teaching affiliation with Duke University Medical Center. DEXA scanning became available at NEMC in October, 1996. Since that time, information on patients referred for DEXA scanning has been maintained in a database. The recorded data include population variables such as the name of the referring physician, patient characteristics, and the type of treatments (if any) used for osteoporosis before and after BMD testing.

We performed a retrospective analysis of the database to characterize baseline demographics and prior treatment of patients referred for BMD testing by community physicians, and to determine the influence (if any) of BMD testing on the institution of specific osteoporosis treatments. We looked at whether or not there was difference in the use of medications to diminish bone resorption, and whether or not there was a "favored" therapy. We also sought to examine whether the presence of certain clinical risk factors influenced the use of therapy after DEXA.

Methods

BMD of the spine and hip were measured using a Hologic 2000 axial densitometer according to standard protocol. Quality of the measurements was assured by daily measurement of a phantom and calibration if necessary. We reviewed DEXA reports for all patients scanned between October, 1996, and July, 1997. Reports included the name of the referring physician, age and sex of patients, bone density data and statistical comparison of patient data with young and age-matched normative controls. DEXA scans were categorized as normal or abnormal (osteopenic or osteoporotic) based their T Score, a statistic that determines the magnitude of the difference between the patient's BMD and the average for race- and gender-matched individuals at the peak of bone density. The calculation uses the following equation:

$$\text{T score} = \frac{\text{Patient BMD - Peak BMD}}{\text{Standard Deviation of Peak BMD}}$$

T scores that are greater than −1.0 are considered normal; those between −2.0 and −2.5 are considered osteopenic; those less than −2.5 are considered osteoporotic.

Among the patients referred by primary care physicians (not endocrinologists or rheumatologists), we identified 220

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Table 1. Characteristics of 134 patients with osteoporosis or osteopenia

Average age (years)	68.4±11.8*
Number of women	126 (94%)
Number of men	8 (6%)
Number with risk factor	
Hypogonadism	122 (91%)
Previous fracture	38 (28%)
Radiographic abnormalities	33 (25%)
Corticosteroid use	34 (25%)
Average T score	
AP spine	-2.33±1.08*
Lateral spine	-2.92±1.1
Total hip	-2.16±0.99

*Standard deviation

Table 2. Therapy in 134 patients before and after bone density testing

Treatment	Before DEXA	After DEXA
Calcium	58 (43%)	105 (78%)
Multivitamin	28 (21%)	32 (23%)
Vitamin D	22 (16%)	60 (45%)
Calcitonin	9 (7%)	31 (23%)
Hormone replacement	47 (35%)	64 (48%)
Alendronate	4 (3%)	51 (38%)

who had osteopenia or osteoporosis based on DEXA criteria. A total of 132 clinical charts were available for review by a physician or a nurse to identify relevant features of clinical history and medical management. We recorded each patient's history of fractures, radiologic abnormalities suggestive of osteopenia or osteoporosis, evidence of estrogen or testosterone deficiency, and whether there was significant use of systemic corticosteroids. We noted use of medications such as bisphosphonates, calcitonin, hormone (estrogen or testosterone) replacement therapy, calcium, vitamin D,or multivitamins before and after the DEXA scan. We documented any significant change in therapy, including medication adjustments, following the abnormal DEXA scan.

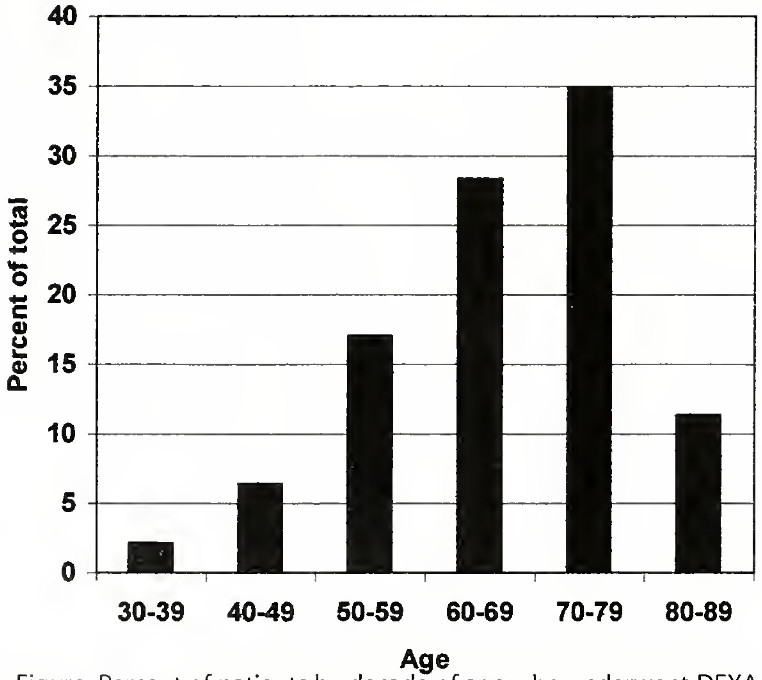

Figure. Percent of patients by decade of age who underwent DEXA testing at Northeast Medical Center between 1996 and 1997.

The number of patients starting each new therapy after DEXA was analyzed by chi-square, one sample test to determine whether all therapies were applied equally. Proportions of hypogonadal patients on specific treatments before and after DEXA were also analyzed using chi-square test of a 3x2 table to test whether treatments given before and after DEXA were equally and independently distributed. Probability (p) values less than 0.05 were considered significant.

Results

All 429 DEXA reports generated during the specified time period were reviewed. Almost half of the referrals for DEXA were initiated by internists, and the rest were ordered by a variety of subspecialists, including endocrinologists, rheumatologists and gynecologists. The mean age of referred patients was 66.7 years (range: 17-91); 93.5% of patients were women and 6.5% were men. Analysis by decade of life revealed that the greatest number of referred patients were between 70-79 years old (Figure). Seventy-nine of the 429 patients (18%) were found to have no significant decrement in bone mass; the remaining 350 patients (83%) were reported as having either osteopenia or osteoporosis.

In the subgroup of 220 patients with abnormal DEXA results who had been referred by primary care physicians (88% of whom were internists), 134 were available for review; the analysis is based on this group. All 134 patients were osteopenic or osteoporotic based on T scores of -2.0 or less on scans of the anteroposterior spine, lateral spine, or hip. The aver age age of these patients was 68 years, and 94% were women. The vast majority (92%) of the patients were hypogonadal; 28% had a clinically apparent fracture, and 25% had another relevant radiologic abnormality such as osteopenia or vertebral compression; 25% had a history of significant glucocorticoid use (Table 1). Medication use before and after DEXA, including calcium, vitamin D (alone or as part of a standard multivitamin), hormone replacement therapy, nasal calcitonin, or oral alendronate are shown in Table 2.

After the abnormal DEXA results were obtained, the referring physicians started 61% of patients on calcium; only 4% were started on multivitamins, but a somewhat surprising 34% were started on vitamin D supplements. As shown in Table 2, most patients were started on some type of pharmacologic therapy after DEXA scanning gave abnormal results. The most common initial treatment in this group of predominantly postmenopausal women was alendronate, and there was a clear statistical difference in the number of patients begun on alendronate compared to estrogen or testosterone hormone replacement therapy (HRT) or calcitonin (47 vs 17 and 22 patients, respectively; p<0.01). Indeed, in hypogonadal patients on no pre-existing pharmacologic therapy before DEXA, there was a clear trend favoring alendronate amongst the different therapies used after DEXA. We looked at whether the underlying diagnosis influenced the likelihood of global or specific treatment following DEXA. Use of all therapies increased after DEXA, but the numbers of patients in each diagnostic group was too small for any meaningful statistical analysis (data not shown).

"We were surprised that relatively few hypogonadal patients began HRT after an abnormal DEXA, especially compared to the large number who started alendronate."

Discussion

Osteoporosis is a common and debilitating condition that affects many North Carolinians. Recent advances in diagnostic and therapeutic strategies, including measurement of BMD and use of anti-bone resorptive medications, make the condition preventable or treatable, but despite these advances, many individuals at risk of osteoporosis are not evaluated or treated. Because of this, the North Carolina Osteoporosis Prevention Task Force was formed in 1997. In 1999, through the efforts or the Task Force (and the Federal Bone Mass Measurement Act passed by Congress in July, 1998), the NC General Assembly passed house bill 314, which requires insurers to cover bone density testing for qualified individuals. Qualifying criteria include estrogen deficiency in those at clinical risk of osteoporosis, radiographic osteopenia, chronic glucocorticoid use of greater than 3 months duration, history of low-trauma fractures, medical conditions known to cause osteoporosis (organ transplantation, uncontrolled hyperthyroidism, Vitamin D deficiency, etc), or to confirm therapeutic response in those on osteoporosis therapy.

It seems reasonable that a diagnosis of osteoporosis by bone density studies would lead to treatment, but this issue has been studied only infrequently to date. This prompted us to examine the impact of DEXA scan results on treatment for osteopenia and osteoporosis in a community hospital. Our results show that abnormal BMD by DEXA increased the use of calcium, vitamin D and a variety of anti-resorptive therapies in the studied population. Previous reports have primarily evaluated the effect of DEXA on the use of HRT or behavioral changes in women with low bone density. Phillipov showed that Australian women were more likely to begin HRT after an abnormal DEXA.[7] Rubin showed that menopausal women informed about low BMD were more likely to use HRT and make behavioral modifications to reduce fracture risk.[8] (The pre-DEXA rate of use of HRT in our patients is similar to those reported by Phillipov and Rubin). Jones demonstrated that young women with demonstrated osteopenia (T <-1.0) were likely to increase calcium intake and physical activity more than those with normal BMD.[9]

We were surprised that relatively few hypogonadal patients began HRT after an abnormal DEXA, especially compared to the large number who started alendronate. HRT is generally considered the first step in treatment of hypogonadal patients with osteoporosis, but in fact, almost twice as many previously untreated hypogonadal patients began alendronate as began HRT after DEXA (41% vs 22%). This may reflect a perception by the primary care physicians that alendronate is more efficacious than HRT, or a reluctance of the physicians or patients to use HRT, or some combination of these factors. Medical contraindications to hormone therapy, time constraints limiting adequate discussion about HRT, or physician or patient concerns about long-term side effects of HRT may also have contributed to its relatively low rate of use. It is probably also important that our observations were made shortly after the introduction of DEXA testing in this community. The average age of individuals undergoing DEXA has fallen over time, and the use of osteoporosis therapies such as HRT and selective estrogen receptor modulators (SERMs) has increased accordingly. While these factors may influence the current rate of HRT use, our results suggest that it is not the preferred first-line choice of osteoporosis treatment as it should be, and that alendronate is used perhaps inappropriately to treat patients who should receive HRT.

We did not observe any glaring differences in the use of specific medications for a specific diagnosis, but the small number of patients in each diagnostic category did not allow us to draw firm conclusions about this. HRT was used (appropriately) more often in hypogonadal patients, although the rate of use after DEXA did not differ between diagnoses. This is emphasized by the fact that only 32% (8/25) of hypogonadal patients on glucocorticoids started HRT after DEXA. The percentage is comparable to the relatively low rate of HRT use in glucocorticoid-treated patients seen by Buckley.[10] It is not clear why HRT is used so infrequently in these patients, but it may be a reflection of "resistance" to HRT use in general, as outlined previously.

Perhaps the most striking finding that we observed was the relatively robust use of some pharmacological treatment following DEXA scanning in this group of elderly patients. Fully two-thirds of patients started a new medication for osteoporosis after scanning. By contrast, the rate of medication introduction (even calcium!) is much lower after hip fracture. Bellantonio found that 54% of patients took calcium following a hip fracture, and only 8% took antiresorptive therapy.[11] Kamel found that only 3-5% of patients took calcium and vitamin D following hip fracture, and only 2% had BMD assessment.[12] Similar findings have been observed in the United Kingdom, although the rate of antiresorptive use after vertebral fracture was better (39%).[13] The reason why so few doctors prescribe medications after fractures is unclear, but it may relate to the advanced age of many of the patients and the presence of co-morbid disorders that prohibit the use of drugs. In any case, it is encouraging that we found that DEXA scanning itself positively influences treatment.

Our findings, although intriguing, are limited by the fact that our study is retrospective, and that a large percentage of the charts we sought were not available. Since we looked only at the charts of patients who did indeed have osteopenia or osteoporosis, we cannot speak about the misapplication of medication to patients in whom it is not indicated. Nevertheless, a very large proportion of the charts we reviewed showed that patients had been (appropriately) treated following DEXA. Perhaps only physicians who were likely to institute therapy consented to chart review, thus leading us to overestimate the true rate of post-DEXA medication use in the entire population. Still, the rate of medication use appears to be much higher than that observed by Bellantonio after hip fractures.

Our findings suggest that when BMD testing is available, it will be used and that physicians are quite likely to initiate therapy in patients found to have osteopenia or osteoporosis. However, we found preferential use of alendronate over HRT when hormone replacement should have been the preferred treatment. Further studies will be needed to determine that patients remain compliant with therapy, and to assess whether the short and long term risks for fracture are reduced.

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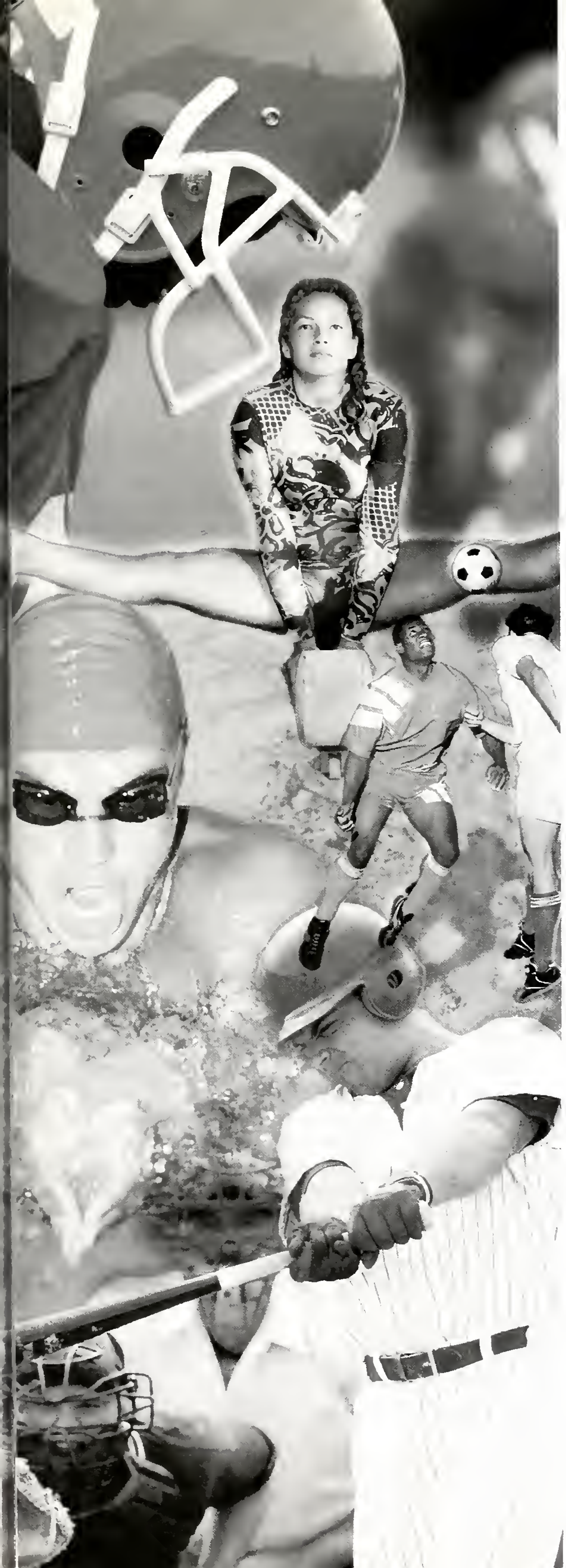

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Recent Changes in Vaccination Guidelines

An Update on Vaccines and Target Population Initiatives

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Vaccines are considered one of the ten greatest public health achievements of the past century, credited with eradicating smallpox and producing the lowest incidence of polio in history.[1,2] Today, vaccination rates have reached an all-time high, and the incidence of the 21 diseases for which vaccines are currently available continues to decline.[3,4] This trend is expected to continue into the 21st century as a direct result of new vaccine development and campaigns to reach at-risk populations that are not currently vaccinated. Recent research efforts have focused on vaccines for organisms like rotavirus and pneumococcus, which have become more significant pathogens with the eradication of other devastating diseases.

Approximately 45,000 people in the US die each year from complications of vaccine-preventable illnesses. Surprisingly, these deaths are far more common in adults than in children.[5,6] The at-risk adult population gets vaccinated at rates ranging from 63% for influenza to 43 % for pneumococcus, much lower than rates in children.[6] This difference is the result of public education campaigns promoting childhood immunizations and school policies requiring vaccination before enrollment. The adult-child disparity has led to public-health initiatives aimed at adult patients.[5] In this review we describe recent and proposed changes in guidelines for adult and child immunization (Appendix 1). We also review programs to help physicians and other healthcare providers attain the target immunization rates.

Childhood Immunization Guidelines for 2000

The most recent guidelines published by the Advisory Committee on Immunization Practices (ACIP) differ from earlier versions. Three vaccines (oral polio, cellular pertussis, and rotavirus) and one excipient (the preservative thimerosal) have been removed.[7] We discuss each in turn.

Oral Polio Vaccine. Poliomyelitis is a highly contagious disease caused by the polio virus. Although it is often asymptomatic, the paralytic form of the disease can result in up to 10% mortality.[8] The introduction of two vaccines—an oral, attenuated live virus formulation (the Sabin vaccine) and an injectable, attenuated virus formulation (the Salk vaccine)—eradicated this devastating disease from the western hemisphere by the mid 1990s.[9] However, a rare side effect of the live virus oral vaccine is vaccine-associated paralytic poliomyelitis (VAPP), which occurs in about 1 out of every 750,000 children getting their first dose of oral vaccine. VAPP can be as severe as wild-type disease,[8] and can occur in both recipients of the vaccine and close contacts. From 1980 to 1994, 40 cases of VAPP were reported in contacts of oral vaccine recipients.[10] Immune compromise increases the risk to recipients and contacts 3,000 fold.[11]

The oral vaccine was attractive to practitioners and parents alike because it was easy to administer and eliminated some injections from the pediatric immunization schedule. However, the risk of VAPP raised concern about using it as the sole agent for polio immunization. In 1997, the ACIP advocated use of oral vaccine only after 2 doses of the injectable (Salk) vaccine because the risk of VAPP outweighed the risk of poliovirus infection.[8] Implementation of this sequential schedule has cut the incidence of VAPP in half (although cases do still occur).[12]

Recent further revisions of the polio vaccine guidelines are based on the continually decreasing incidence of polio worldwide and eradication of the disease in the western hemisphere. The ACIP now believes that no risk of VAPP is justified, and has removed oral polio vaccine completely from ACIP recommendations for 2000.[7] However, oral

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polio vaccine still should be used in three situations: (1) to control outbreaks should they occur; (2) to protect previously unvaccinated children traveling to areas where polio virus is endemic; and (3) to immunize children whose parents refuse the number of injections now required.[13] In the latter case, injectable vaccine should be used for the first two doses and oral vaccine for the third and fourth doses (as recommended in the 1999 ACIP Recommended Childhood Immunization Schedule).[14]

Cellular Pertussis Vaccine. Since the 1940s, it has been recommended that children be vaccinated against pertussis. As with polio, there are two formulations of the vaccine. A suspension of killed *Bordetella pertussis,* (the whole-cell vaccine), has been the traditional preparation, but it often induces adverse reactions (fever, prolonged crying, and local reactions, as well as rare instances of convulsions and encephalopathy). Newer, acellular vaccines contain pertussis toxin and one or more additional bacterial component. They provide similar efficacy, but only half as many adverse events. As with polio vaccine, safety concerns provided the stimulus for the revised recommendations that only acellular pertussis vaccines be used.[7]

Recently, a fifth dose of pertussis vaccine has been proposed for children who have received their fourth dose before the age of 5 years. Currently, only one formulation (Acel-Immune®) is approved for this booster dose when acellular vaccine was used for the first 4 doses of the series. However, if a child has received at least one dose of the whole-cell vaccine as part of the series, any acellular formulation is acceptable for the fifth, booster immunization.

Pertussis vaccine is routinely combined with diptheria and tetanus in a single injection. The most commonly used combination (DtaP) contains acellular pertussis and can be used safely. Acellular pertussis vaccine is also available in combination with other vaccines such as *Haemophilus influenzae*, type b (HiB). Currently, these combinations are only approved for the fourth dose of pertussis vaccination, although manufacturers are seeking to expand approval to the first three doses. Practitioners should consult the Centers for Disease Control and Prevention (CDC) resources (see Appendix 2) to determine the current status of each preparation and to verify whether it is appropriate to use combination products for doses 1-3 of the pertussis series.

Rotavirus. Rotavirus-associated gastroenteritis is a relatively common viral infection that affects up to 80% of American children by the time they are 5 years old. In this country rotavirus is the most common cause of diarrhea and dehydration in infants and young children, and leads to about 55,000 hospital admissions each year.[16] World-wide, rotavirus infections lead to 600,000 to 800,000 deaths per year. The financial burden of lost days of work and school, medications, and hospitalizations prompted the development of a vaccine against rotavirus.

The Rotashield® vaccine, developed by Wyeth-Ayerst, is a live virus vaccine, first marketed in August 1998. However, after less than a year on the market, the American Academy of Pediatrics recommended that use of the vaccine be suspended because of reports of adverse events.[17] The specific concern was intussesception of the bowel. The vaccine was approved on the condition that it be studied further because 5 cases of intussesception were reported in clinical trials in over 10,000 patients.[18] As of July 1999, over 1.5 million doses of vaccine had been administered, and 23 cases of intussesception were reported to the Vaccine Adverse Events Reporting System (VAERS).[19] Intussesception typically occurs within 4 weeks of vaccine administration, usually in children under 4 years old (the target population for the vaccine). These findings led the manufacturer to voluntarily withdraw the vaccine from the market in October 1999. Present ACIP recommendations do not call for administration of rotavirus vaccine.[20]

Thimerosal. This mercury-containing compound has been used as a preservative in vaccines since the 1930s[21] to prevent both bacterial and fungal growth, particularly in multi-use vials. Vaccines give only minimal exposure to mercury, but a review of the mercury content of all food and drug products found the potential of exceeding federal guidelines for methyl mercury exposure when vaccines are given in the first 6 months of life.[21] The American Academy of Pediatrics and the United States Public Health Service issued a joint position statement in July 1999 calling for removal of thiomerosal from all vaccine products.[22] In October 1999, the ACIP recommended that thimerosal be removed as soon as possible.[23] It is important to note that no cases of mercury toxicity have ever been reported in children receiving vaccines under previous ACIP guidelines.

Six currently marketed vaccines (hepatitis B, diphtheria, pertussis, tetanus, HiB, and influenza) may contain mercury, depending on the manufacturer. With the exception of influenza vaccine, there are thimerosal-free preparations of all these vaccines, and the Food and Drug Administration

(FDA) is committed to timely review of all new thimerosal-free preparations developed. Present recommendations call for using thimerosal-free vaccines when possible; older formulations are acceptable if there are no alternatives.[23]

Proposed Changes for 2001

Pediatric Pneumococcal Vaccine. Infection with *Streptococcus pneumoniae* can be prevented by vaccination, but it still causes nearly 500,000 cases of pneumonia annually. Vaccination rates have been suboptimal despite the proven safety and efficacy of the vaccine.[25] The resultant annual costs to society total $4 billion.[24] Furthermore, since wide-spread use of HiB vaccine began, *S. pneumoniae* has replaced *H. influenza* as the most common cause of meningitis in children.[24] Previously, pneumococcal vaccines were approved for use only in children older than 2 years.

In February 2000, the FDA approved the first pneumococcal vaccine (Prevnar®) recommended for children under 2 years of age. In contrast to the vaccine previously available (for patients more than 2 years old), which covered 23 strains of *S. pneumoniae* with a single dose, four doses of Prevnar® immunize against only 7 of the most commonly encountered strains.

The ACIP issued recommendations regarding the use of the pediatric pneumococcal vaccine in 1999. Originally it was suggested that the vaccine be given to all children under the age of 5. This was changed, however, based on pharmacoeconomic data—the first time in history that ACIP recommendations incorporated financial considerations.[26] The total cost for the four-dose series will be more than $230. The revised guidelines advise immunizing only children under 2 years and those aged 2-5 at high risk because of immunocompromise or ethnic factors. In general, the 23-strain vaccine can and should be used in children older than 2 years of age.

> "Only 63% of the eligible population was vaccinated in 1997, barely meeting the national target goal of 60%. In April 2000, the ACIP revised its recommendations in hopes of improving vaccination rates."

Two-Dose Hepatitis Vaccine. Previous ACIP recommendations have advocated a 3-dose regimen of hepatitis B vaccine. In September 1999, Merck received FDA approval for an alternative regimen of 2 doses of 10mcg each for adolescents aged 11-15 years. In February 2000, the ACIP included this regimen in the Vaccines for Children Program.[27] The new recommendations are for two 10mcg doses 4-6 months apart, rather than three 5mcg/doses. Efficacy data show both 2- and 3-dose regimens result in similar antibody titers and rates of antibody decline over time, with no difference in observed side effects.[27] ACIP recommends completion of the 3-dose series for any adolescent who has already received at least the first 5mcg dose.

Changes in Adult Influenza Guidelines

About 20,000 Americans die of influenza each year despite the availability of a safe and effective vaccine. The ACIP has advocated annual vaccination for all persons 65 years old and older and those with immunosuppressive conditions. However, only 63% of the eligible population was vaccinated in 1997, barely meeting the national target goal of 60%.[6] In April 2000, the ACIP revised its recommendations in hopes of improving vaccination rates. The primary changes are a decrease in the target age of patients to be vaccinated and a delay in the start of vaccination because of difficulties in producing adequate supplies in time for the traditional September start date.

Now, everyone 50 years old and older should be vaccinated. Vaccination campaigns will begin in mid-October, allowing manufacturers to deliver supplies to all areas before the start of the vaccination season. However, for the 2000-2001 flu season, manufacturing problems, including lower than predicted vaccine yields, have further delayed the start of these initiatives until mid-November. Patients at high risk of mortality from influenza should be vaccinated as soon as initial supplies are available.

Vaccination-Related Initiatives

Reporting of Adverse Events. Many recent and proposed changes in the ACIP guidelines are based on incidents that occurred after vaccine preparations had been marketed. An essential part of identifying these problems is VAERS. VAERS is a voluntary system that allows health professionals, patients, and guardians to anonymously report any side effects. More than 12,000 reports are made annually, and the data are used to target areas for FDA review and investigation. The primary purpose of the VAERS program is quick identification of adverse effects not detected during pre-marketing trials, but the data are also used to detect contaminated vaccines. It is important to note that the VAERS data cannot determine causality; the reports are used only to highlight potential problems and to prompt further FDA investigation. Information and reporting materials may be obtained from the FDA, which oversees the program in combination with the CDC (see Appendix 2).

Vaccine Administration Initiatives. The success of vaccination programs in the US can be attributed in part to their widespread acceptance. However, vaccination rates are still suboptimal in many groups, especially those of lower socioeconomic classes, and among African-Americans and Hispanics. Traditional vaccination initiatives, such as pre-school vaccination requirements, free vaccination clinics, and public health education campaigns, have done little to improve these problems.

Vaccination trends are tracked by the US Department of Health and Human Services and the Office of Disease Prevention and Health Promotion via the Healthy People Initiative. This health promotion and disease prevention program, begun in 1979, targets 28 specific areas including vaccination. The program identifies specific populations that fall below targeted immunization rates, but it does not address ways to improve adherence. The most recent initiative, called Healthy People 2010, was released last January to give a progress report on the goals of Healthy People 2000 and to identify targets for the coming decade.[6] The primary targets are adult vaccination and the disparity in vaccine rates among certain racial and ethnic groups.

In order to increase adult compliance with vaccination recommendations, recent initiatives use non-traditional ways of promoting immunization. The CDC has issued descriptions and quality standards for nontraditional techniques such as the use of standing orders to increase the rates of pneumococcal and influenza vaccination in at-risk patients, and the use of non-physician health care providers to give vaccines.[8] Sites identified as targets for these programs include long-term care facilities, correctional institutions, home health agencies, and assisted living facilities. Among the purported benefits of these programs is increased patient acceptance of the costs of vaccination. It is often less expensive to obtain vaccines at non-traditional locations than in a physician's office.

The growing interest in using non-physician health care professionals was prompted in part by the report of a hospital pharmacy-based intervention program in 1998.[28] The authors assessed the eligibility for vaccination of patients admitted to medicine services. They found that nearly 30% of the 447 screened patients were eligible for pneumococcal vaccination, but at discharge less than the desired 60% of eligible patients had actually been vaccinated. Recently, students from Campbell University and the University of North Carolina Schools of Pharmacy carried out a similar screening program to identify candidates for pneumococcal vaccination at four medical centers throughout North Carolina. They were not themselves able to administer the vaccines, but student recommendations led to a 21% increase in vaccination of at-risk patients.[29]

In another program featuring community-based immunization initiatives, a chain of pharmacies in Virginia held immunization clinics 3 days per week.[30] Over 2 years, more than 23,000 influenza and 1,800 pneumococcal vaccine doses were given. Several other pharmacies are conducting similar efforts with positive results.

Non-physician health care providers are being recruited to head vaccination programs targeted at underserved populations. Pharmacists have been specifically identified as vaccine advocates and facilitators. Thirty states currently allow pharmacists to administer vaccines, although not all yet have pharmacists giving immunizations. Other health care professionals used as immunizers include nurse practitioners, visiting nurses, and members of the National Black Nurses Association. These groups are all currently involved in efforts to increase access for patients underserved by traditional programs.

Concerns have been raised about the liability of non-physician health care practitioners who administer vaccines. Professional organizations have published position statements defining individual roles in vaccination programs. In addition, several of these groups have developed educational programs and materials to ensure candidate identification and proper training in how to administer vaccines. The CDC reviews such programs and approves those meeting its criteria. To date, the only non-physician program endorsed by the CDC is the American Pharmaceutical Association's (APhA) Pharmacy-Based Immunization Delivery Program. This educational program combines prepared written course work and hands-on, live sessions to teach vaccination techniques. The CDC is in the process of preparing standards for similar programs that want endorsement.

Conclusions

Recently, several changes have been made to recommendations regarding immunization. Some of these new recommendations, such as the withdrawal of rotavirus and oral polio vaccines, will have a direct impact on practitioners and patients, whereas removal of the preservative thimerosal and the whole-cell pertussis vaccine will not greatly change practice. In the coming year, more people than ever will be more than 50 years old, and thus candidates for the influenza vaccine. All children under 2 years of age will eligible for vaccination against *S. pneumoniae*. The goals of Healthy People 2010 will raise the bar for immunization rates even higher than previous targets. The impact of these modifications on vaccine-preventable diseases will be closely tracked and evaluated. Continued efforts of health care professionals in all disciplines will help us meet the recommended targets.

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Appendix 1. Summary of updated recommendations for vaccination

Vaccine	Old Recommendations	New Recommendations
Polio vaccine	4-dose schedule; oral vaccine may be used for the 3rd and 4th doses	4 doses of injectable vaccine, unless - outbreaks occur - children traveling to endemic area in <6 months - parents refuse number of injections required
Pertussis vaccine	4-dose schedule; whole or acellular formulation acceptable	Consider 5th booster dose; only acellular vaccine to be used
Rotavirus vaccine	Added to 1999 vaccine schedule	Removed from market and ACIP recommendations
Thimerosal preservatives	Allowed	Must be removed from all vaccines; thimerosal-free preparations to be used where available
Pediatric pneumococcal vaccine	Available formulation only approved for patients >2 years old	4-dose schedule; should be given to all children <2 years and high-risk children aged 2-5 years
Hepatitis vaccine	3-dose series; 5mcg/dose for children; 10 mcg/dose for adults	2-dose series (10mcg/dose) approved for adolescents aged 11-15 years
Influenza vaccine	Annual vaccine for those >65 years old and high-risk patients; vaccine initiatives begin in mid-September	Annual vaccine for those > 50 years old and high-risk patients; vaccine initiatives begin in mid-October*

*mid-November for 2000-2001 vaccine season

Appendix 2. Web-based vaccine information resources

http:\www.cdc.gov	Centers for Disease Control and Prevention
	Morbidity and Mortality Weekly Report ACIP Guidelines CDC Prevention Guidelines National Vaccine Program Office
http:\www.immunize.org	Immunization Action Coalition
	Vaccine information statements for health care providers and patients Free print materials
http:\www.niaid.nih.gov	National Institute of Allergy and Infectious Diseases
	The Jordan Report- an initiative to promote development of new vaccines Information about ongoing vaccine research
http:\www.health.gov	Full text of Healthy People 2010
http:\www.vaers.org	Vaccine Adverse Events Reporting System
	Program information and reporting materials
http:\www.fda.gov	US Food and Drug Administration

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Preventing Childhood Poisoning

An Intervention in a Family Medicine Residency Program

Suzanne E. Eaton-Jones, MD, Karl B. Fields, MD, Teresa Rasco, and Ola Kunle B. Akintemi, MD

Even after three decades of public health efforts, accidental poisoning still causes a significant number of hospitalizations and medical visits for children. In 1998, children younger than three accounted for 40% of poisonings, and the age group under six accounted for 53% of poisonings (including 2% of toxin fatalities). A total of 1,181,006 million children under six were poisoned, 99.5% of them unintentionally.[1]

In 1998, Kistler et al surveyed patients attending a family medicine residency program about childhood poisoning.[2] The results were worrisome. They found that 23% of families had experienced an accidental poisoning, but 17% of families stored medications so that they were accessible to children, and 31% stored cleaners and 30% stored cosmetics that were accessible. Only one-fourth of Kistler's respondents recalled having a doctor speak to them about poison prevention. And, although the American Academy of Pediatrics recommends that all households with children have one ounce of syrup of ipecac available to administer in case of accidental poison ingestion, only 33% had ipecac at home.[3]

Kistler et al concluded that resident physicians should do a better job of educating parents and caretakers about poisoning prevention. That recommendation led us to institute an educational intervention for Family Practice residents. We hoped to increase residents' knowledge of strategies used to prevent poisoning and to stimulate them to discuss poisoning with patients, thereby increasing patients' knowledge of those strategies.

Methods

We used the same site used by Kistler—a community Family Practice Center (FPC) with Area Health Education Center and university affiliations. As in the Kistler study, the demographic characteristics of our population were more typical of a teaching program than of its metropolitan environs. The majority of participants were young, female, and Medicaid recipients.

The intervention involved a lecture to the residents, followed by a test on the core principles of poison prevention. We also announced that free samples of ipecac were available in the FPC for distribution to patients who made visits for well child checks (WCCs). Immediately after the required one-hour lecture, residents were tested on their awareness of the following: (1) substances that are considered household poisons (household cleansers, pharmaceuticals, chemicals, cosmetics, plants, pesticides, hydrocarbons, alcohol, paint gases and fertilizers); (2) proper use of the regional poison control center (PCC), the best information resource for accidental poisonings; (3) the need for caretakers of young children to have ipecac at home; and (4) the four principles of safe storage of hazardous items (keep items in their original containers, use child proof containers, keep items locked up, and keep items out of reach).[1,4,5] Residents who did not correctly answer all questions were given individual education; thereafter, notices were posted reminding residents that ipecac samples were available for distribution

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during WCCs of patients aged six months to five years. Three months after the educational intervention, we administered the survey used by Kistler et al to see if the lecture and test had affected residents' counseling behaviors and, consequently, caretakers' practice and knowledge.

A total of 109 parents or primary caretakers of children under the age of six who were patients at the FPC were eligible for the study. Eight of the 109 eligible families were excluded because they saw the doctor before the survey could be completed or because the caretaker could not speak English. The remaining 101 caretakers were interviewed at the end of the three month intervention period, at a scheduled appointment, but before they saw the doctor. Participants were asked about storage of various poisons, about their experience with and knowledge of what to do in the case of accidental poisonings, and about whether a doctor at the FPC had ever talked to them about poison-proofing their home. Responses were divided into two categories, depending on whether or not the respondent had had a WCC visit (and an opportunity to receive poison prevention guidance) during the intervention period. The statistical methods used to analyze the data were chi-square and Fisher's exact test.

"We had hoped that an educational intervention would increase the amount of time residents devoted to poisoning prevention education, but the literature suggests that such efforts have a less direct effect on injury prevention than passive interventions ..."

Results

Sixty-two of the 101 respondents (61%) had had a WCC during the three-month intervention period. Of these, 48% kept syrup of ipecac at home, compared to only 31% of those who had not had a WCC—and thus had not been offered ipecac (p = .061); only 31% of those who had had a WCC % recalled a doctor talking to them about poisoning prevention, compared with 28% of those who had not had a WCC. In both this study and Kistler's, more than 90% of respondents kept cosmetics, cleaners and medicines in the original containers, and over 80% reported keeping medicines out of reach of children. Of concern, 23% of respondents said they would use ipecac without first consulting a health care professional.

When asked what they would do if a child in their care swallowed a poison, 47% of caretakers said they would call a PCC; 37% would call a doctor, hospital, or 911; 5% would go to an emergency department or urgent care center; 2% would induce vomiting; and 9% didn't know or had other responses. Kistler found that 50% would call a PCC; 27% would call a doctor, hospital or 911; 13% would take the child to an emergency department, hospital or doctor's office; 8% would take some kind of action, including induce vomiting; and 3% were unsure how they would respond.

Discussion

The educational intervention appeared to increase the rate of ipecac possession in the household, but the 48% possession rate in the group that had a WCC during the intervention period did not quite reach statistical significance compared to the control group, although it is higher than the national possession rate of 26%. The increase we observed was less than that reported for similar interventions with emergency care patients in which ipecac possession rose from 42% to 68%[6] and from 47% to 94% when patients had actually been poisoned.[7] These trends all point in the same direction, but the higher rate of ipecac availability in emergency department studies may represent different demographics, regional norms or, very possibly, subjects having direct experience with a child's poison ingestion. The emergency department studies reporting increased ipecac use gave free samples, as we did. A mailing of coupons for ipecac carried out by a poison control center showed no significant change in the percentage of households with ipecac.[8] There is controversy as to how aggressively public health policy should encourage households to have ipecac, but current efforts leave room for improvement. Most medical groups continue to advise using ipecac to reduce the amount of time a poison is in the body.

From the standpoint of patient education, our results were disappointing. Even after a targeted intervention, relatively few caretakers remembered talking to a physician about poisoning. The fact that reported possession of ipecac did increase suggests that residents at least mentioned poisoning prevention in their encounters; perhaps their advice was not comprehensive enough or was given in a way that left no lasting impact. We had hoped that an educational intervention would increase the amount of time residents devoted to poisoning prevention education, but the literature suggests that such efforts have a less direct effect on injury prevention than passive interventions such as child-proof closures, strip packaging, or reducing the concentration of caustic substances in household products.[9] Indeed, a recent Policy Statement by the American Academy of Pediatrics' Committee on Injury Poison Prevention declares that behavioral research is needed to improve patient education methods because "education is essential even when the focus is on passive prevention."[10] A recent meta-analysis supported including injury prevention counseling during WCCs, but the authors acknowledged that the long-term benefits of counseling have not been documented.[11]

Another recent article found that family physicians felt less comfortable providing guidance on poisoning prevention than did their pediatric colleagues. Interestingly, in this study, education about poisoning prevention did not appear to affect the behavior of residents, but postgraduate courses in the topic did. However, this type of research reports only the physician's perspective, and does not indicate that patients received poisoning education.[3]

Finally, the fact that only 47% of our respondents said they would call a PCC if their child had swallowed a poison confirms reports of the public's limited understanding of the role of PCCs.[2,5,12] The time lost by contacting a PCC through a hospital or doctor's office, or in transporting a child to medical treatment delays therapy and may increase costs. Clearly, more effort needs to be spent in educating the public about the role and use of PCCs. A key aspect of poison prevention education may be repetition of the basic principles.

Conclusion

Childhood poisoning is a significant cause of morbidity and mortality. Therefore, doctors need to be aware of strategies to prevent poisoning and of ways to provide anticipatory guidance to patients. The literature suggests that we encourage research that will delineate the most effective ways of educating caretakers about poison-proofing homes and about how to use the local PCC. To date, the greatest success has come from passive strategies, such as placing child-proof caps on medications. Educational efforts by doctors have had limited success; this may mean that they require coordination with public media campaigns if they are to influence caretakers about poison prevention and treatment. Without these additional strategies, it is unlikely that we will see a decrease in the number of accidental ingestions suffered by children in this country.

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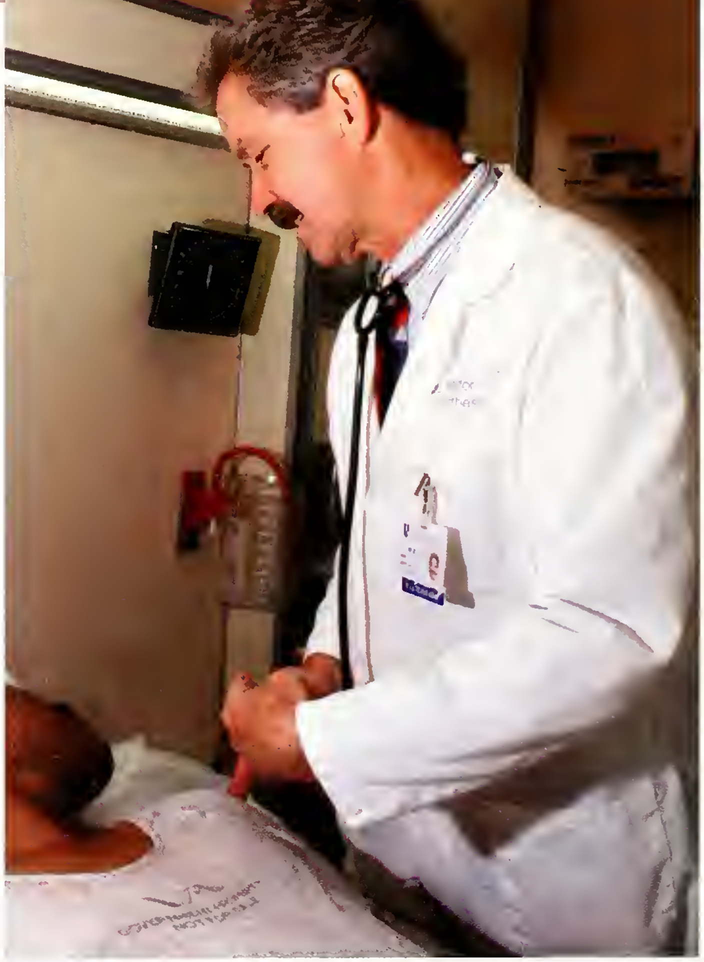

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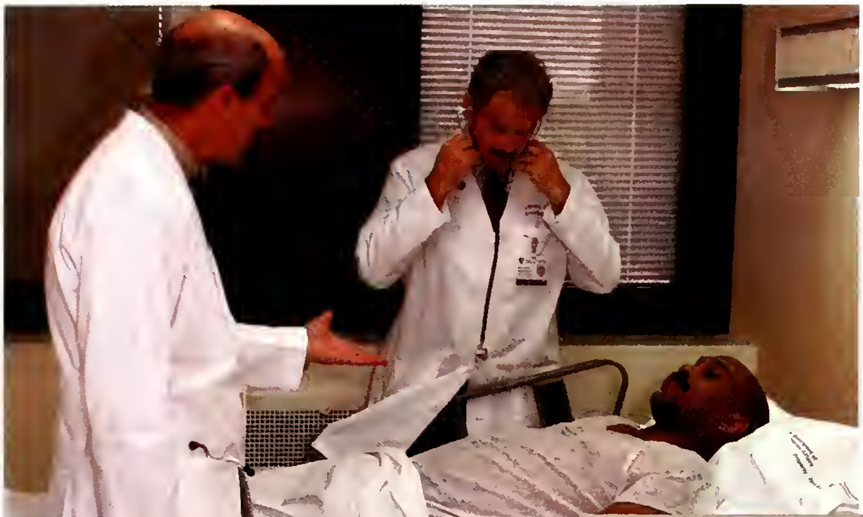

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CASE REPORT

A Woman with Abdominal Pain and Bilious Vomiting

A Very Late Aftermath of Billroth II Gastrectomy

Michael Golioto, MD

Surgery has become rare for peptic ulcer disease because of improvements in endoscopic therapy for bleeding ulcers, the discovery that Helicobacter pylori is a treatable cause of ulcers, and the routine use of potent acid-suppressive therapy. Eradication of *H. pylori*, with or without concomitant long-term acid suppression, is often all that is needed for ulcer healing. Surgery is now used mostly to treat complications of ulcer, such as bleeding of perforation. But, even though surgery is not first-line therapy for ulcer disease, we continue to see patients who have undergone gastrectomy for ulcer disease and suffer many of the long-term complications.

The Viennese surgeon Theodor Billroth described two ways to anastamose the gastric stump to the small intestine after distal gastrectomy: In Billroth I the anastamosis is made directly to the duodenum, while in Billroth II the proximal duodenal remnant is closed off and the gastric stump connected to the jejunem (Figure 1). Complications of Billroth II gastrojejunostomy include dumping syndrome, ulceration of the anastomotic margin, malnutrition, malabsorption, vitamin B_{12} deficiency, delayed gastric emptying, and afferent loop syndrome. Afferent loop syndrome, although uncommon, can occur in an acute form within days after gastojejunostomy or as a chronic syndrome months to years later.[1] In this paper I report a patient who developed afferent loop syndrome (diagnosed by barium radiography and endoscopy) 25 years after Billroth II gastrojejunostomy for peptic ulcer.

The Patient

A 55 year old woman was referred for evaluation of abdominal pain of several years duration. She had had a number of surgical procedures, including appendectomy in 1954, Billroth II gastrojejunostomy in 1972, cholecystectomy in 1978, total abdominal hysterectomy for fibroids in 1978, and exploratory laparotomy with lysis of adhesions in 1989 and 1999. She had a chronic pain sydrome, treated with long term narcotics, and hypertension.

She described severe, cramping pain in her right upper abdominal quadrant. The pain was exacerbated by eating, and partially relieved by her recurrent bouts of bilious emesis. She vomited approximately 10 times a day, had lost 30 pounds of weight over the preceding 6 months. She had little appetite, but could tolerate small amounts of liquids; large meals induced a bloated sensation, followed by nausea, and partial relief upon vomiting. She did not drink alcohol or use non-steroidal anti-inflammatory drugs; there was no history of pancreatitis, change in bowel habits, jaundice, fevers, chills, or acholic stools. She had come to an emergency room and been admitted for evaluation several times over the previous two years.

The numerous abdominal surgeries and prior lysis of adhesions raised the suspicion of a partial small bowel obstruction, so an upper gastrointestinal series with small bowel follow-through was carried out (Figure 2). This showed preferential filling of the afferent loop of the Billroth II gastrojejunostomy but markedly delayed emptying. The patient's symptoms were reproduced during the radiographic study. The afferent limb was widely patent and there was no obstruction to flow, but upper intestinal endoscopy revealed a stenotic anastomosis of the afferent limb, with friable tissue but no evidence of ulceration (Figure 3). A computerized tomogram of the abdomen revealed no evidence of masses, pancreatitis, or bowel obstruction.

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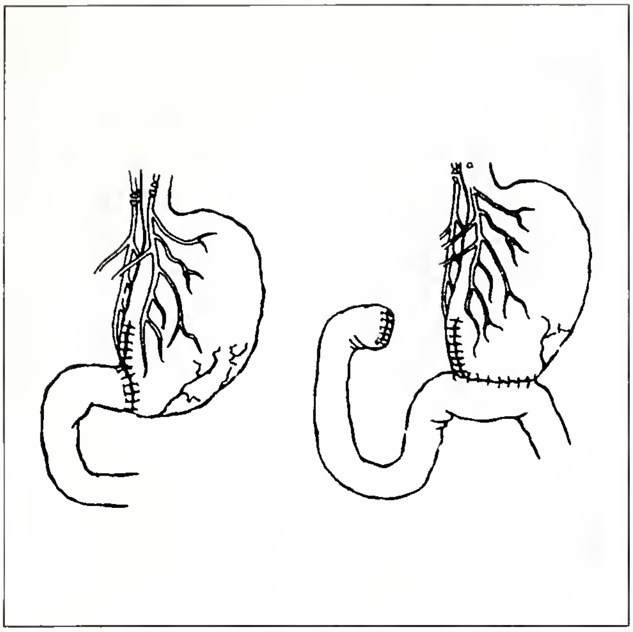

Figure 1. Diagram of Billroth I (left), with anastamosis directly to the duodenem, and Billroth II (right), with proximal duodenal remnant closed and gastric stump connected to jejunem.

The patient underwent a loop duodenojejunostomy with lysis of adhesions, after which her complaints of bloating and vomiting were improved. She does still complain of abdominal pain, but it is decreased in intensity and unrelated to food intake as before.

Discussion

The difficulties and complications of afferent loop syndrome associated with Billroth II gastrojejunostomy have been known since 1949, when Steinberg identified afferent loop stasis.[2] Wells and MacPhee, in 1952, coined the term "Afferent-loop syndrome and described the clinical features, radiographic appearance, and treatment."[3] Wells and MacPhee considered afferent loop syndrome to be a purely mechanical phenomenon. They believed the complaints of bilious regurgitation following a meal were due to trapping of postprandially secreted bile within the closed afferent loop. They felt that the trapping of secretions in a closed space caused pressure to build up within the lumen, distending the loop and producing feelings of fullness, spasm, and pain. When the pressure reached a peak, the contents of the afferent loop were expelled and regurgitated, with relief of the pain and fullness. The luminal contents of the afferent loop might be trapped for periods varying from minutes to days, causing variations in the clinical presentations. They described the normal appearance of the stomach remnant and efferent limb on barium radiography, but noted that the afferent limb did not fill with barium, suggesting an anastomotic obstruction to flow.

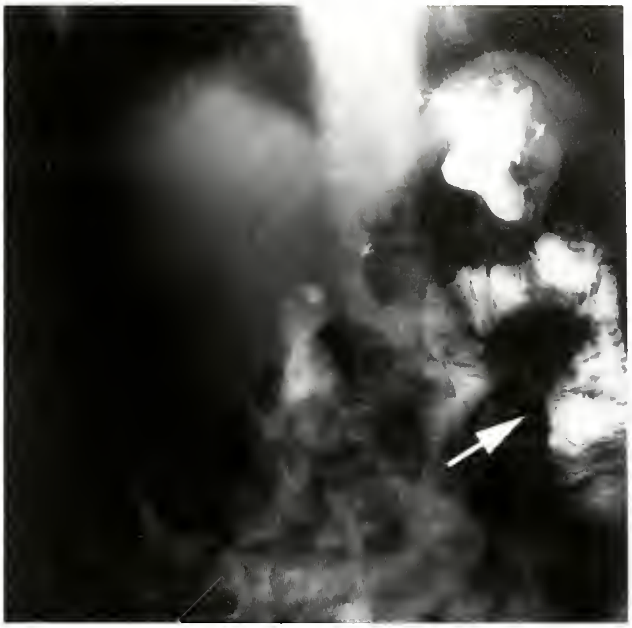

Figure 2. Upper gastrointestinal series with small bowel follow-through demonstrating preferential filling of the afferent limb with barium (arrow).

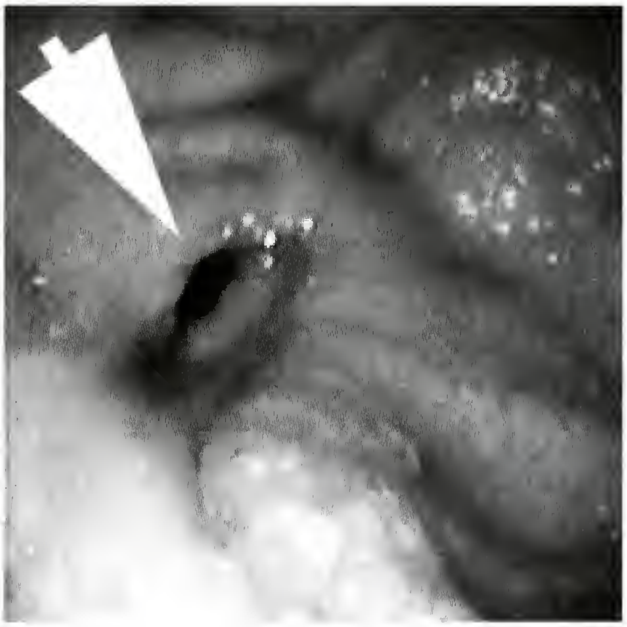

Figure 3. Endoscopic appearance of the stenotic anastomosis (arrow) of the afferent limb of jejunum to stomach.

Hoffman and Spiro reviewed the problems related to afferent loop syndrome in 1961.[4] They describe two cases, and noted a new finding on barium radiography. They found the gastric remnant to be normal, but observed that barium preferentially and promptly entered and distended the affer ent limb, which was markedly delayed in emptying. These findings are consistent with those in my patient.

There are several causes of afferent loop stasis and obstruction. During a 24-hour period, the afferent limb produces 1-2 liters of secretion.[4] Inadequate emptying leads to distention within short periods of time. Kinking of the afferent limb because the segment is either too long or too short, torsion, internal herniation, anastomotic ulcers, or extrinsic adhesive bands have all been implicated as causes of the afferent loop syndrome.[4-6]

Presenting symptoms of the afferent loop syndrome other than postprandial, bilious vomiting and pain include acute pancreatitis.[6] Pancreatitis has been reported in 16 cases of afferent loop syndrome; it is thought to be a consequence of high residual pressures within the loop obstructing the free flow of pancreatic secretions.

All therapeutic approaches to afferent loop syndrome rely on repair of the mechanical abnormality causing obstruction of the afferent limb. Surgical approaches include jejunoplasty, conversion to a Billroth I, and revision with Roux-en-Y anastomosis.[7]

Summary

Patients with a history of Billroth II gastrojejunostomy who present with a symptom complex of postprandial nausea, fullness, and bilious vomiting leading to relief should be suspected of having an afferent loop syndrome. Diagnosis depends on barium radiography and upper intestinal endoscopy. Surgical correction is the treatment. The current age of medical therapy has dramatically decreased the frequency and necessity of surgery for peptic ulcer disease. However, we should not forget the lessons of the past and fail to diagnose a patient who has a chronic complication of a previously common operation.

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Public Health in North Carolina

The New Deal Comes to Raleigh

Stuart Levin, MD

On June 16, 1998, 7 of the 8 members of the Raleigh City Council voted in favor of the Raleigh Housing Authority's (RHA) request to tear down and rebuild Halifax Court in the central part of the city. The RHA then requested $30 million in aid from the federal Department of Housing and Urban Development under its Hope VI program, designed to demolish "the country's worst public housing" and to rebuild inner cities with more human-scale dwellings. In recent years, the 58-year-old Halifax Court public housing project had become a high-crime area, and maintenance of the 318 units had become a problem. There were persistent plumbing leaks and other structural problems in the barracks-like complex.

The perception of Halifax Court was once quite different. It was considered a "wonderful community in its time,"[1] and a shining light in the fight for public health. The construction of subsidized modern housing was one of a number of new public health initiatives undertaken during the New Deal era (1933-41). When the New Deal arrived, health officials in North Carolina had already been active for a number of years in efforts to eliminate preventable deaths, but the rural and urban poor were slow to feel the effects of these attempts.

Raleigh, the capital city, had a large indigent population living in unsanitary conditions, poorly protected from a multitude of health threats. In the early 1930s, the economic emergency of the Great Depression worsened an already difficult local situation. As the tax base fell, large-scale public works and social welfare projects were put on hold. The strategy of retrenchment at the federal level was only abandoned after President Roosevelt took office in 1933. With congressional support, Roosevelt employed deficit spending to counter the Depression's devastating impact.

For the first time, the federal government began to intervene in many areas of North Carolina life. However, New Deal programs were not imposed as dictates from Washington. Their implementation required the administrative support of existing local government agencies, and their success depended on the assistance of private pressure groups. Public health was one such arena of federal involvement during the New Deal. Appropriations funneled through the alphabet soup of New Deal agencies gave public health advocates in Raleigh some latitude to implement local initiatives. While relatively small in scale, these efforts foreshadowed the large- scale governmental programs of the postwar period.

Public Health Directions: State, Local, and Federal

Public health work in North Carolina started in 1877 when the NC General Assembly allocated $100 to establish the North Carolina State Board of Health (NCSBH). Over the years, the Board gained power and money via legislative acts requiring vaccination against a number of infectious diseases. When the General Assembly authorized county boards of health in 1911, the public health administration in North Carolina added another tier. The State Board was empowered to investigate the causes of diseases considered hazardous to public health, gather morbidity statistics, and distribute public health information. Regulations for the protection of public health were drawn up and enforced by the Board. Local boards were mandated to carry out and broaden public health efforts at the county level. These boards were responsible for medical care for the indigent; school health supervision; water, milk and sewage disposal; and insect control. The tasks of immunizing against typhoid fever and diphtheria, as well as isolating infectious cases of tuberculosis also fell to the county boards. However, both the state and county boards were hampered by inadequate support. The NCSBH was funded by a cautious General Assembly, and the county boards depended on local appropriations and very limited state subsidies.

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North Carolina had made some successful efforts in the fields of sanitation and vaccination in the first decades of the 20th century, but in 1930 many public health threats remained insufficiently addressed or ignored. Infant mortality and venereal disease rates were significantly higher than the national averages,[2] but had been barely addressed from a public health standpoint. Tuberculosis and diphtheria persisted in poorer rural and urban areas of the state. And then came the Depression, which led to marked retrenchment of public funding in all areas. Health-related programs were particularly hard hit, as seen in the NCSBH budget, which fell from $486,000 in 1929 to $292,000 four years later.

New Deal legislation enhanced federal cooperation with local and state public health groups. Much of the new funding came in the form of grants. Sizable aid for maternal and infant care was channeled through the United States Children's Bureau. The United States Public Health Service (USPHS) sought $25 million to combat venereal disease, and the Public Works Administration took on slum clearance and the provision of low-cost housing.[3] Many of the new federal social welfare programs were tied to financial disbursements from the states. Aid to the unemployed, indigent elderly and to dependent children was to be a state responsibility. The states would receive matching funds after establishing schemes approved by the federal government.

The activist federal government stood in stark contrast to the inertia at the state level. North Carolina's government was dominated by fiscally conservative chief executives and legislators. As in all Southern states, the New Deal ran counter to the region's deep interest in a balanced state budget. J.C.B. Ehringhaus, governor from 1933-1937, favored a new sales tax and aggressive retrenchment of state government. He said: "Some day there is going to be a widespread protest against the rapidly growing congressional practice of setting up dollar matching enterprises. In the very nature of things, the states cannot continue indefinitely a dollar matching contest with the Federal Government, whose credit and vast resources far exceed those open to the states."[4]

In 1936, Clyde Hoey defeated a gubernatorial opponent whose platform said "Let's Have a New Deal in North Carolina." When Roosevelt characterized the South as "the nation's primary economic problem" based on its minimal level of public services, low tax base, and the poverty of its people, Hoey retorted that "North Carolina is the stalwart supporting child of this nation." The General Assembly, controlled by rural and large business interests, followed this line.[4] Matching funds were, therefore, limited by intransigence at the state level. On the other hand, grants were accepted eagerly by local and state public health authorities. The 1933 NCSBH budget increased more than twofold to $881,000 by 1938, and then doubled again to $1,792,000 four years later. During those same 9 years, the allocation from the General Assembly increased from only $225,000 to $370,000 and still was not back to pre-Depression levels by 1942. In contrast, the 1942 NCSBH budget included over $735,000 for venereal disease and general health work from the USPHS, and $400,000 from the US Children's Bureau for maternal and child health.[5]

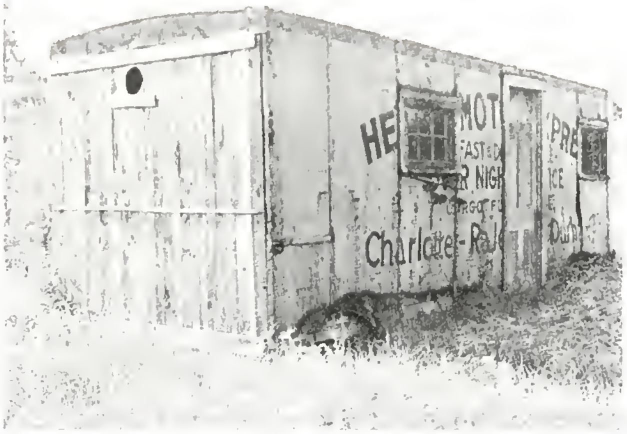

Figure 1. An old truck body serves as a private home near Chavis Heights. From "Good Homes for Raleigh," Raleigh Housing Authority, 1945.

The Community of Raleigh

As one of the largest cities in the state, Raleigh was a typical Southern urban area in terms of social makeup and public health problems. Its population in 1930 was 37,379, roughly two-thirds white and one-third black. It was largely an administrative center whose major employer was the state government, but there was a small component of industry. About 1200 people worked in the manufacture of textiles, cottonseed, and wood products, as well as chemicals, clothing, and food items. Many low-income whites were employed in the factories and as menial labor. The black population was employed primarily as common labor. Together, these groups made up about half of the city's residents; they lived mostly in slum housing in segregated neighborhoods of South and East Raleigh. The Depression put many lower-class people of both races onto the dole, although the city's role as the hub of state government cushioned the unemployment. (Raleigh was essentially bypassed economically by World War II as well. No major new war industries were established in the city, although there was a modest increase in employment seen at Peden Steel, Pilot Mills, and Premier Worsted Mills.)

The need for strong public health services was illustrated by the inferior living conditions in South and East Raleigh (Figure 1). In 1940, 47% of available housing was substandard, either needing major structural repairs, or lacking running water or a private bathroom.[6] Inadequate sanitation, overcrowding, and poor ventilation helped set the stage for the spread of contagious disease. Interviewed after a visit to one such area in 1938, Wake County Health Officer Dr. A.C. Bulla told the News and Observer: "No, I don't reckon I've got anything today that you'd call news, unless itch, poverty, and dirty homes are news. I've been to half a dozen homes since noon and I don't see how any of the people in them live. I don't know whether it's the itch, sorriness, confounded sorriness, or something worse is wrong."[7]

The poor housing was exacerbated by low wages and high prices during the New Deal era and into the war years. In early 1944, the state Department of Labor found the minimum cost of living for a family of four to be $33.67 a week; at the same time, the Raleigh Housing Authority estimated the lowest rental with utilities for a standard house to be $38.00 for a white family, and $28 for a black family.[6] Landlord opposition, aided by conservative political interests, limited construction of federally subsidized low-rent housing throughout North Carolina. A 1939 WPA Real Property Survey of Raleigh showed the vacancy rate to be 1.6%, and this fell practically to nil during the war. As a result, a significant percentage of the population did without the "luxuries" of food, clothing, and medical care.

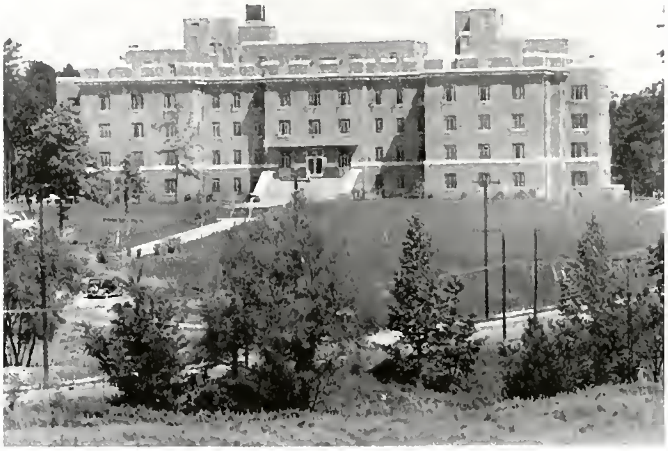

Figure 2. Rex Hospital, Raleigh, NC, ca. 1939.

Public Health Organization in Raleigh

The city-county Wake County Board of Health (WCBH) was established in 1919 to serve the public health needs of a county whose population had reached 94,757 in 1930. Almost 60% of Wake County's population lived in outlying areas, but public health efforts and facilities were concentrated in Raleigh. By the early 1930s, the WCBH had eleven employees, among them a full-time health officer (a physician), a dentist, and three nurses. The WCBH administered pre-school and school health programs, clinics for tuberculosis, prenatal clinics, and public sanitary inspections. As federal allocations increased during the New Deal era, the Board broadened its efforts against infectious diseases. The Board's 1935 budget of $27,677 more than doubled by 1940, allowing six additional nurses to be hired. The influx of funds occurred despite a drop in the paltry state allotment from $1560 in 1935 to $1392 in 1940.

Members of the Raleigh medical community often served in the public clinics without compensation. Two of the three hospitals in Raleigh participated in the public health efforts. Rex Hospital (Figure 2), a public hospital for the white population, had a general outpatient unit serving all races. This facility provided $60,000 in charity care in 1935, an increase from $21,000 in 1927. Rex had a continuous waiting list as the primary provider of inpatient medical care in the community. In view of the constant overcrowding, a new building was opened in 1937, increasing the bed capacity from 126 to 200. Funding for the new facility was provided by a $100,000 direct federal grant from the Public Works Administration. An additional federal loan of $287,000 was provided for indigent care. According to a contemporary account,

"Three years ago (in 1933), the dream of a newer finer Rex began to take form as a small group of interested citizens determinedly set out to secure government aid for the project. Obstacles were encountered at every turn. A special act had to be put through the General Assembly to allow Raleigh and Wake County to amortize the Federal loan. A test case was carried through the courts to the State's highest tribunal to prove the right of Rex to use federal funds. . . But now the heroic struggle nears the end. . . .in this three year crusade in the name of humanity.[8]

Raleigh was served by two additional hospitals. St. Agnes Hospital was supported by the city, county, Duke Endowment, and Episcopal Church. Prenatal and well-baby clinics for the non-white population were located at St. Agnes. The smallest hospital, Mary Elizabeth, was a private white facility that generally did not share in the public health initiatives. Social service clubs such as the Junior League of Raleigh and the Woman's Club, whose members were socially prominent white women, were also active in efforts to expand public health clinics in Wake County.

Disease Prevention Efforts

Syphilis. In 1939, there were 300,000 cases of syphilis in North Carolina. This represented 9% of the population (personal correspondence of State Health Officer Carl V. Reynolds, February 2, 1939. NC State Archives). According to the USPHS, the incidence of syphilis was up to 40 times higher in the US than in Western countries that had aggressively fought the disease as a matter of public policy. Syphilis was physically devastating, given the progression of untreated disease to secondary and tertiary forms. Primary transmission of syphilis was through sexual contact, but 10% of cases were congenital. Without penicillin, treatment of syphilis in the 1930s was an arduous and expensive process involving the injection of arsenicals in combination with bismuth salts.

As James H. Jones points out in his book on the Tuskegee experiment, syphilis was thought of as the "quintessential black disease." A study by the Metropolitan Life Insurance Company revealed that between 1911-15 and 1931-35, syphilis mortality in the South declined by 45% for whites, but increased by 38% for black men and by 14% for black women. Many whites ascribed the prevalence of syphilis among African-Americans to the race's supposed proclivity to crime and sexual vices. Poor hygienic habits, primitive living conditions, and ignorance of the germ theory of disease were given secondary consideration. In order to create support for venereal disease programs directed at the black community, public health officials in the South had to appeal to the self-interest of whites.[9] In the late 1930s, using knowledge gained during the earlier syphilis control efforts sponsored by the Rosenwald Fund, the USPHS launched a major campaign to combat syphilis throughout the country. North Carolina public health officials were quick to take advantage of the new funds to coordinate a full-scale, highly-publicized program to curb venereal disease. The NCSBH hired a consultant speaker to address educational groups across the state, and syphilis education was incorporated into the state high school science curriculum. At a time when even the very word "syphilis" was taboo, the NCSBH used the press and radio to deluge the public with information about syphilis and its treatment. The Raleigh *News and Observer*, a bastion of New Deal liberalism under editor Jonathan Daniels, led a campaign to sway white public opinion in support of public health efforts against syphilis, saying, "Southern white people helping Negroes arise from squalor and sickness are indulging in no philanthropy; they are exercising only such sense and enlightened selfishness as will best serve themselves."[10]

In 1937, the General Assembly passed, and local health officials enforced, a law requiring that all domestic servants be examined at least once a year for syphilis and tuberculosis. Three years later, the legislative body approved a bill requiring testing to certify that all individuals planning marriage were free of syphilis. The NCSBH funneled both federal and state aid for control of venereal disease to local regions, with free lab service and syphilis treatment provided by the state.

In 1938, an aggressive venereal disease program was begun in Raleigh. Clinics for the indigent were held twice a week at Rex and five days a week at St. Agnes. Because one-fourth of all county jail inmates were infected with syphilis, in 1940, public health officials set up a syphilis clinic at the jail. Strict attitudes towards patients with syphilis characterized the control effort. Anyone with a positive Wassermann test was compelled to undergo treatment from a physician or proceed to a clinic. Those who refused faced prosecution and possible imprisonment under an old but rarely enforced state law. In one case, a Raleigh judge sentenced both an infected teenager and his common-law wife to six months in jail for violating the state law. The welfare department took custody of the woman's four minor children.

By 1942, a cautiously optimistic Dr. Bulla noted that the local venereal disease control program had "met with a certain degree of success", although it "should be broadened and extended until every case is found and adequately treated."[11] Morbidity statistics confirmed his assessment. New cases of untreated syphilis in Raleigh peaked at 708 in 1939, and declined to 441 three years later. Raleigh became a national clearinghouse for syphilis information. The Venereal Disease Education Institute, sponsored by the USPHS, the NCSBH and the Z. Smith Reynolds Foundation, supplied educational materials to many cities and states, and the US Army.

Still, widespread prejudice and ignorance overshadowed the public health efforts. One anonymous N.C. county health officer noted, "Our syphilis program is worrying me, as we just don't have the time to follow up our delinquents and I know that with many of our VD patients it is a matter of transportation. I am sorry to say that as yet the public hasn't been fully awakened to the necessity of treatment and you know that our landlords just don't realize that 'the [tenant] is sick' but 'he is just trifling and not worth a damn' according to their ideas. Then, too, they can't see the necessity of letting their men stop work for two or three hours to 'take a shot' when they are not sick."[12] Combating venereal disease has required aggressive educational efforts well into the antibiotic age. As of 1998, North Carolina had the greatest number of primary and secondary cases of syphilis in the nation, with Wake County among the 28 United States counties with half of all early syphilis cases (78% of them among African Americans).[13]

Tuberculosis. The public health campaign to eradicate tuberculosis ran second only to the efforts against venereal disease. The airborne spread of the tuberculosis bacillus made infection common when environmental and hygienic conditions were bad. Poor ventilation, inadequate diet, overcrowding, and lack of education predisposed to developing active tuberculosis.

In contrast to syphilis, tuberculosis prevention efforts had been under way in North Carolina for many years before the New Deal began. Local tuberculosis societies were formed at the beginning of the century, and Christmas Seals were sold annually to help finance the treatment of tuberculosis. By the mid-1930s, scientific control measures had reduced tuberculosis from the 1st to the 7th leading cause of mortality in North Carolina. Nevertheless, tuberculosis per

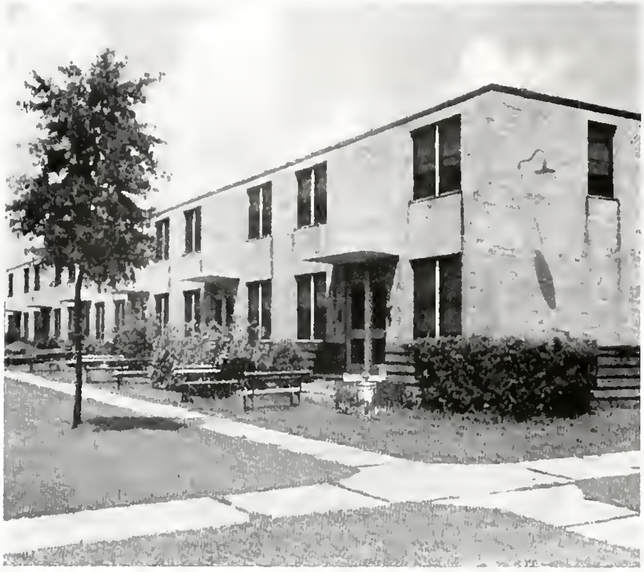

Figure 3. One of the low-cost housing units constructed in Raleigh in the early 1940s.

sisted in poor rural and urban areas; in 1936, over two thousand North Carolinians died of the disease, and in 1933 110 new, untreated cases were diagnosed in Raleigh.

Subsidized modern housing (Figure 3) represented one novel approach to combating the spread of tuberculosis. The federally supported Halifax Court and Chavis Heights projects (for white and black citizens, respectively) opened in 1940-41. These developments provided 462 new housing units for a city with 5,000 substandard dwellings. The overall impact was small, but the new tenants saw a drastic improvement in their living conditions. One twelve-year old resident compared her old and new accommodations: "When you wake up in winter, it's wonderful. You don't worry about making a fire at all. There's hot water any time .... There's light and quiet and room for studying here, too. You know, you can't concentrate when you're all jammed up."[6]

The WCBH lacked both the wherewithal to construct more low-cost decent housing, and the workforce to improve sanitary and living conditions in existing housing. Nonetheless, the very existence of a Raleigh Housing Authority was a major accomplishment, given the fierce hostility of the real estate establishment. During the New Deal and WWII eras, Raleigh and Wilmington were the only two major North Carolina cities to obtain federal funds for low-income housing. Vigorous opposition from landlords prevented slum clearance attempts in Winston-Salem, Charlotte, Asheville, and Greensboro.[14]

Given their inability to increase the number of subsidized housing units, public health officials in Raleigh concentrated on expanding tuberculosis sanatoriums. Civic groups and public-minded individuals had campaigned for a Wake County Sanatorium for the indigent since 1907. The Raleigh Woman's Club kept the issue alive for decades until adequate funding became available. In 1937, WPA assistance made possible the construction of a 24-bed sanatorium, and a 40-bed "preventorium" (for children likely to develop tuberculosis). Both buildings were segregated by race and sex. In addition, Raleigh community physicians held tuberculosis clinics twice a week. The preventorium was subsequently converted into a Negro sanatorium, and the extra beds in the original sanatorium used for whites. By late 1940, the expansions had left only three black women waiting for admission (despite 8 vacant beds on the white wards).

Notwithstanding the growth of sanatorium beds, morbidity statistics from Wake County do not reveal any definitive trend in the number of new, untreated cases. The limited expansion of public housing could not compensate for the persistence of poor conditions in which most indigent families lived. Near-eradication of tuberculosis only came a decade later with the development of adequate antibiotics.

Maternal and Infant Care. In the 1930s, most indigent women in North Carolina had no prenatal care. In 1930, the state's infant death rate was 79 per 1000 births, well above the national average of 65 per 1000.[2] One-third to one-fourth of all babies born in North Carolina (including most black infants) were delivered by 4,000 untrained midwives. The NCSBH estimated that nearly two-thirds of newborn deaths were preventable. Polluted water, foul milk, exposure to cold in the winter and insects in the summer, and congenital diseases such as syphilis exacerbated the general lack of prenatal care.

In 1929, the state's first weekly prenatal clinics for the indigent were organized at Rex and St. Agnes Hospitals. Medical services were provided primarily by Raleigh private practitioners. The clinics were financed for several years entirely by local individuals and charitable groups such as the Junior League. Raleigh physician, Verne Caviness, noted in 1937, "In all clinics, the financing has been purely local. There has been no outside or government aid except for the Federal Emergency Relief Act aid of $17.50 paid to the physicians for making a few of the deliveries in 1934. When no funds were available with which to buy medicine for these patients, the physicians have furnished them."[15]

A significant change in maternal and infant care occurred as a result of funds provided through the Social Security Act. The new federal allocations spurred the growth of prenatal care, and the establishment of clinics for the newborn. In 1937, 437 patients were treated at the Rex prenatal clinic, up from 177 the previous year. With the improved access to care, many physical defects and nutrient deficiency diseases such as pellagra could be corrected. Women with syphilis could also receive affordable treatment, with a resultant decline in fetal transmission of the disease.

The new well-baby clinics offered immunizations, physical examinations, milk bottles, clothing and equipment for newborns. In some cases, contraceptive measures were encouraged to prevent birth of infants likely to be diseased secondary to congenital factors. As a result of all these efforts, the infant death rate in Raleigh dropped to 44/1000 live births forwhites and 56/1000 for blacks by 1945. But despite the progress, unsanitary living conditions continued to needlessly threaten many newborn lives.

Conclusion

Public health measures for the poor in Raleigh were broadly expanded with the influx of New Deal-related federal grants. Organizational assistance for this growth in services was provided by the NCSBH, despite a lack of support for the New Deal at the state executive and legislative levels. Publihealth-related initiatives found advocates among important sectors of the local population, including private physicians, social service organizations, and the press. Still, the actual building of physical structures such as the subsidized housing at Halifax Court was the exception, and the predisposing causes of substandard housing and poverty remained essentially intact in Raleigh through the end of World War II.

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The Beginning of Emergency Medicine

A Personal View from North Carolina

Eben Alexander, Jr., MD

By the 1950s and '60s the world of medicine had made significant progress. We were enjoying the use of a number of effective drugs like insulin, as well as several antibiotics (including streptomycin for tuberculosis); Vitamin B_{12} was known to cure pernicious anemia. There were new approaches to the treatment of heart disease, pacemakers for heart rhythm disturbances, and even the hope of truly effective psychotropic drugs.

People who were sick, or thought they were sick, turned more and more to hospitals for care. North Carolina enjoyed great success in introducing federally financed Hill-Burton hospitals into many communities. There was a popular consensus that hospitals offered ideal treatment, particularly emergency treatment. In the late '60s and early '70s, demand for emergency services grew more rapidly than hospitals responded. The medical profession made unsuccessful efforts to react to the need. In medicine, as in so many other fields of endeavor, new advances had brought unforeseen and unanticipated problems. This was true of the development of emergency medicine as a specialty. During the late '60s, emergency medical care was an ever-growing concern. Emergency room facilities were inadequate in most hospitals, including my own; emergency rooms were staffed by medical and surgical house officers, and senior physicians. To provide coverage, my institution had to conscript every member of the faculty to serve on a rotational basis.

I served as Chief of Professional Services and Chief of Neurosurgery at the North Carolina Baptist Hospital/Bowman Gray School of Medicine complex from 1953 to 1973. At meetings of the chiefs of professional services, I heard strong opposition to required coverage of the emergency room. In particular, radiologists objected that they had not gone into medicine to provide "hands-on" care of people in emergency rooms. Still, we decided to have the radiology faculty cover the emergency room on a regular basis, assisted by a triage nurse. This did not seem so bad since previously there had been no attending physicians on duty, only a triage nurse to call specialists to the emergency room when the patient's complaint seemed appropriate to the particular specialty.

Providing coverage was not a unique problem. The Forsyth Memorial Hospital (previously City Hospital of Winston-Salem) required all staff to cover the emergency room on nights and weekends on a rotational basis. Institution of this policy led several physicians, particularly pediatricians, to resign from the staff. Soon efforts were made to employ people specifically to cover emergency rooms; at our own institution, two former residents in general and thoracic surgery were hired to provide coverage on a rotational basis, assisted by a triage nurse.

At about nine o'clock one evening in the late '60s or early '70s, Dr. Russell Perry, a pediatric practitioner in Forsyth County, came to my office. We knew each other well, so he was not reluctant to let me know just how very disturbed he was about being forced to cover the emergency room, seeing so many patients that he did not know how to treat effectively. As a rotating intern at Jefferson Hospital in Philadelphia, Dr. Perry had had to cover the emergency room. He felt very inadequate, particularly after the first patient he saw, a personal friend, died of cardiac arrest. He thought that if he had been better prepared he could have done better. After his Jefferson Hospital experience (and to his great regret), he had to cover emergency calls during service in the Navy. He suggested to me that the Department of Surgery begin a training program in emergency medicine. My reaction was to doubt that we could enlist people to do this, but I agreed we would try. We outlined a program that would have trainees rotate through various specialties over a two-year residency leading to certification as emergency medical specialists.

At Dr. Perry's urging we took this issue to the Executive

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Committee of the Chiefs of Professional Services, and finally to the Executive Council of the medical school. Both bodies approved it. With the help of Dr. Richard Myers, then chairman of the Department of Surgery, it was arranged that the Section of Emergency Medical Services would be part of his department. Four newly finished doctors were enrolled to cover the emergency service on a rotational basis; all of them had been through rotations in the surgical department and could instruct the emergency residents-in-training.

With the outline of a training program in hand, we applied to the Bureau of State Services, a "parallel" organization to the National Institute of Health, for a grant to support the salaries of house officers and the expenses of the endeavor. Representatives from the Bureau visited our institution and approved the grant, but then the Bureau of State Services was dropped from the federal budget and so no grant was given. The University of Cincinnati later became the first to receive a grant (from the NIH), and we eventually received a grant as well.

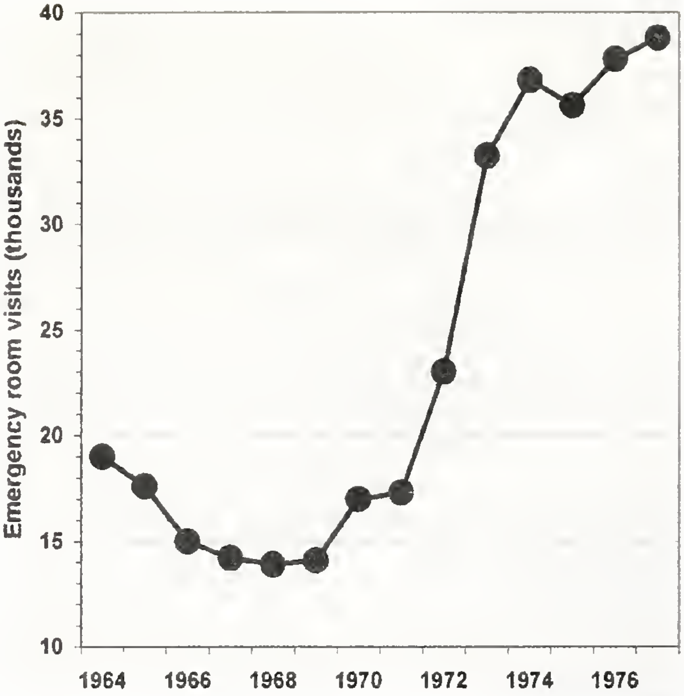

Figure 1: A phenomenal rise in the number of visits to the North Carolina Baptist Hospital Emergency Room began in 1972.

The emergency program was outlined in the minutes of the Department of Surgery Annual Report for 1972-1973:

The first year of training is designed to give the resident an introduction to emergency medicine in both emergency rooms at both emergency departments (Forsyth Hospital and North Carolina Baptist Hospital). He will also have rotations through certain specialty services at the North Carolina Baptist Hospital, these services including internal medicine, general surgery, thoracic surgery, neurosurgery, orthopedics and psychiatry.

During the second year, the resident will be in charge of the emergency department at each hospital for a period of several weeks, with adequate consultation immediately available from senior house staff and faculty. He will complete his specialty rotations by serving a month or so on pediatrics, obstetrics and gynecology, cardiology, endocrinology, intensive care and anesthesia, ophthalmology, and plastic surgery. At least a few additional specialty rotations will be available on an elective basis. Community medicine and how it relates to emergency medicine will be learned by the resident's close work with the well-organized and well-functioning Comprehensive Health Planning Council. He will also participate in training emergency medical technicians for the excellent Forsyth County Ambulance Service. Certain research projects, including delivery of health care and accident prevention, will be encouraged.

At North Carolina Baptist Hospital, the resident will be able to follow patients admitted from the emergency room by attending daily rounds. He will be expected to participate in morbidity and mortality conferences and attend daily X-ray conferences.

A third year of training will be offered as a fellowship year for the resident who hopes to enter academic medicine or who will be in charge of a large emergency department. This third year will provide adequate time for training and experience in administrative matters related to the entire field of emergency medicine.

Dr. George Podgorny, who had trained in cardiothoracic surgery at North Carolina Baptist Hospital, became interested in emergency medicine and was active in eventually having a specialty board approved as the American Board of Emergency Medicine. Fortunately, some of our faculty who were active in the AMA and the American College of Surgeons were able to help the emergency physicians acquire approval for a Section Council in the AMA and a seat in the House of Delegates of the American Medical Association. This was the first step toward obtaining approval of an American Board of Emergency Medicine. There was, of course, opposition from various other boards, including the American College of Surgeons, but the presence of faculty members who were active in the American College of Surgeons, plus the obvious interest of many surgeons across the nation, finally overcame the opposition.

Over 27,000 patients were seen as part of our initial program between July 1, 1972 and June 30, 1973. Since then, the growth of Emergency Medicine as a specialty has been phenomenal (Figure). The specialty of Emergency Medicine is now one of 24 boards approved and endorsed by the American Board of Medical Specialties. The field of emergency medicine now has 16,149 board certified diplomates in the United States, and there are 123 Emergency Medicine training programs. There are similar programs in Canada and in the United Kingdom.

In the United States there is an excellent Society of Academic Emergency Medicine. It holds a large annual meeting at which scientific papers are presented, and many are published in the Society's journal (*Academic Emergency Medicine*), as well as in regional, state, national, and international journals such as JAMA and The Lancet.

This account lays no claim to originality in the area of emergency medicine because many people were interested in this solution to some of the problems arising from great progress in therapeutics and the care of the wounded and traumatized patients. The emergence of Emergency Medicine improved the skills of emergency medical technicians and led to the development of excellent, freely available resuscitation units with well-equipped ambulances and staff. Emergency medicine physicians now have much to be proud of, including this story of how their specialty came about in North Carolina.

Postscript

In the issue of *Academic Emergency Medicine*, for April 2000 (Volume 7, Number 4), one question was asked of the first four presidents of the American Board of Emergency Medicine: Dr. George Podgorny, Dr. John Wiegenstein, Dr. R. R. Hannas, and Dr. Ronald Krome: "If you could identify one turning point of our specialty in the last 25 years, what would it be?"

Their responses were as follows:

Dr. Podgorny: "A major turning point for our specialty in the last 25 years was recognition of the American Board of Emergency Medicine and its criterion-referenced certification examination."

Dr. Wiegenstein: "The major turning point, in my opinion, was when we gained the respect of the non-emergency physician representatives to the American Board of Emergency Medicine (ABEM). They then became strong advocates of our cause and cheerfully led interference for us the rest of the way."

Dr. Hannas: "The approval of ABEM as a primary board (by the American Board of Medical Specialties)."

Dr. Krome: "Recognition of the Board as a primary specialty, and the risk taken by those physicians who elected to take the field test examination prior to recognition of the Board. I must include the committal of the many emergency physicians who contributed to the funding of the field test and examination development without any promise of reward."

Note from the Editor: *In the course of preparing this article, Dr. Alexander corresponded with Dr. Sandra Schneider, past president of the Society of Academic Emergency Medicine. With their permission, we reprint the following letter, giving some further perspectives on the development of the specialty.*

Dear Dr. Alexander:

I was very pleased to receive your letter regarding the residency at Wake Forest. Academic Emergency Medicine has grown substantially in the last several years. As you saw, we are now up to 122 approved training programs (the University of Oklahoma has recently closed its program). We now have 57 academic departments of Emergency Medicine and over 16,000 certified Emergency physicians. Our residency training programs now have PGY1 positions numbering 912.

According to the records of SAEM, the first residency program was at the University of Cincinnati in 1971. Yours was clearly a very early program.

Emergency Medicine would not exist today if it were not for pioneers like you and others who helped to form our specialty. Obviously, these early pioneers all came from fields that were often quite distant from Emergency Medicine. I was trained in Internal Medicine and am probably the last president of the SAEM whose original training was not as an Emergency physician. I recall meeting with my own division chief, suggesting the concept of 24-hour faculty, and being told I was ludicrous. My chief felt it would be a tremendous disservice to the house staff to have faculty available 24 hours a day to oversee their care and to teach them. In addition, when I suggested that I would like to become a full-time faculty member, doing full-time Emergency Medicine, he laughed and asked me what I would do with the rest of my time. I believe he has changed his opinions today and fully embraces the concept of Emergency Medicine.

Emergency Medicine has also become extremely popular with students. Twenty-two medical schools now have a mandatory rotation in Emergency Medicine and almost every other school offers an elective. Even institutions such as my own, which only a decade ago had no attending coverage, now embrace EM and have training programs.

Congratulations on your early success. Your institution has helped forge a specialty—and a hit TV show!

Sandra M. Schneider, MD, FACEP
Professor and Chair
Department of Emergency Medicine
University of Rochester Medical Center
601 Elmwood Avenue, Box 655
Rochester, NY 14642

EXECUTIVE DIRECTOR, Eastern AHEC AND ASSOCIATE DEAN FOR CME

Eastern Area Health Education Center (EAHEC) and the Brody School of Medicine at East Carolina University seek nominations and applications for an outstanding individual to serve as Executive Director of EAHEC and Associate Dean for Continuing Medical Education and Distance Learning. The mission of EAHEC is to provide continuing education to area health professionals, support community-based health profession student education, and collaborate with rural communities and health care facilities in activities designed to enhance the health and well being of rural populations.

Established in 1974, EAHEC, one of nine AHEC centers in North Carolina, serves the 23-county northeastern region of the state. Governed by a board of directors with representation from its constituents, EAHEC is affiliated with East Carolina University schools of Medicine, Nursing, and Allied Health Sciences, as well as the schools of Dentistry, Pharmacy, and Public Health of the University of North Carolina at Chapel Hill. EAHEC works closely with University Health Systems of Eastern Carolina and its affiliate Pitt County Memorial Hospital.

Reporting to the Board of Directors, the Executive Director leads a staff of 17 faculty members and 24 support staff, fosters collaboration with health care agencies and community leadership in developing new health care initiatives, and directs planning and support for community-based educational experiences for medical students, residents and other health science students. In concert with the North Carolina AHEC Program, the Executive Director fosters the link between academic health science centers and practicing community health professionals.

The Associate Dean for CME and Distance Learning has administrative responsibility for quality educational activities, which are planned and implemented in compliance with the Accreditation Council for Continuing Medical Education. In keeping with the outreach focus of both Eastern AHEC and the Brody School of Medicine, this person is responsible for overseeing distance learning activities and provides leadership of the Telemedicine Center.

Additional information may be obtained through the following web sites:
www.greenvillenc.com; www.uhseast.com; www.ecu.edu; www.med.unc.edu/ahec

The successful candidate will hold the degree of doctor of medicine and be certified by a recognized specialty board. In addition, the following qualifications are essential:

- § demonstrated leadership as an educator, clinician, and administrator
- § progressive administrative experience, with responsibilities as division director, department chair, or unit head where success can be demonstrated as well as assessed from peer opinion
- § sensitivity to the problems and needs of a rural area and ability to work collaboratively with a variety of health care educators and practitioners in community clinics and hospitals
- § commitment to academic excellence, keeping abreast of technological developments in health care and education, and lifelong learning
- § flexibility and superb organizational, communication, and negotiating skills
- § ability to manage large budgets and exercise fiscal responsibility

Send applications, nominations, and complete resume no later than December 15, 2000, to the chair of the search committee. References will be required upon request.

Eastern
AHEC

Ralph Whatley, MD
Chair, EAHEC Search Committee
Department of Medicine
Brody School of Medicine at ECU
Greenville, NC 27858-4354

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Caroliance

North Carolina's Health Insurance Cooperative for Small Businesses Needs a Doctor

Janice S. Lawlor, MPH, and Mark A. Hall, JD

In North Carolina and the rest of the country over the last decade, lack of health insurance has been a large—and growing—problem. Lack of health insurance translates into delayed health care, higher costs of treating more advanced disease, poorer health outcomes, and higher out-of-pocket costs for patients and their families. Nationwide, the vast majority (83%) of the uninsured have a job or someone in the family does.[1] The working uninsured are especially prevalent in small firms and among the self-employed (60% of uninsured workers are self-employed or work for firms with fewer than 100 employees).[1]

Because of the disproportionate distribution of uninsured workers in small businesses, federal and state governments have recently focused on making health insurance available and affordable to these firms. North Carolina has been a leader in this movement. In 1992, it became one of the first states to guarantee small companies (presently defined as comprising 1-50 employees) access to health insurance coverage at near-average rates. In 1993, North Carolina became one of the first states to create a state-supported health insurance purchasing cooperative. The intent is to help small groups to obtain better health insurance packages, comparable to those generally available only to larger groups because of their economies of scale and balanced risk pools. North Carolina's purchasing cooperative program is called Caroliance. In this article we report the findings of a case study of the Caroliance program and its effects on the small-group market in North Carolina.[2]

Background and Methods

The information reported here was derived from an intensive seven-state study, funded by the Robert Wood Johnson Foundation, of various insurance market reforms.[3] Data for North Carolina were obtained in two rounds of interviews with representatives of the insurance industry and state regulatory agencies (conducted in 1997 and 1998, with follow-up in 1999). Caroliance was discussed at 14 interviews with two representatives of the state Department of Insurance, four representatives of two insurers, a Caroliance representative, two independent insurance agents, one benefits administrator, and one insurance industry consultant. Discussions were based on an interview guide; subjects were apprised of the purpose of the study and promised anonymity to the extent feasible. Data were analyzed using both qualitative and quantitative techniques.

In 1993, North Carolina enacted legislation creating a system of regional alliances, which small groups could join on a voluntary basis in order to purchase health insurance. In late 1993, the North Carolina General Assembly appointed an 11-member State Health Plan Purchasing Alliance Board (consisting of the lieutenant governor, the state insurance commissioner and nine other members, six of whom represent small business) to develop and oversee the alliance system. An executive director, appointed in January 1994, hired three other staff members over the following year. The State Alliance Board was charged with setting up 4 to 12 non-competing regional purchasing alliances, which were expected eventually to become self-supporting. Six alliances were incorporated initially, each with a governing board of local small-business owners, and an executive director and support staff. A benefits administration company was hired to help the regional alliances with marketing their products to small groups, enrollment, premium billing and collection, payment of agent commissions, and database maintenance. Insurers were recruited to offer a variety of standardized health insurance products through independent health insurance agents. Caroliance began selling its products in late 1995.

Our evaluation of Caroliance is structured according to its intended purposes. The main idea behind Caroliance was

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that it would allow small groups to pool their purchasing power efficiently and thereby reduce health insurance premiums. It was also intended to offer employees a wide choice of benefit plans and insurers, and to streamline the process of quoting premiums. Finally, Caroliance was designed to make competition among insurers in the small-group market more equitable by requiring the sale of standardized benefit plans in the alliances, by monitoring clinical outcomes and customer satisfaction, and by using a risk-adjustment mechanism to spread the risk evenly among participating insurers.[4] It was reasoned that having all participating insurers sell standardized benefit packages would make it easier for purchasers to compare products, and more difficult for insurers to select only "good risk clients" through benefit designs that would discourage subscribers with existing health problems. Assessment of customer satisfaction and other measures of quality would permit evaluation of the insurers' performance. Risk adjustment would help spread subscriber health risk evenly among insurers and thus encourage them to concentrate their energies on administrative efficiency and care management instead of trying to avoid high-risk subscribers.

Consideration of the purposes behind Caroliance suggested the following aspects of evaluation: (1) impact on enrollment and product choice; (2) impact on premiums; (3) participation by and competition among insurers; and (4) the views of insurance agents.

Table 1. Comparison of enrollment through Caroliance or outside market insurers

	1996	1997	1998*	1999*
Caroliance				
Groups	453	1,150	900	913
Lives	1,616	4,300	4,000	2,500
Outside market				
Groups	63,933	66,784	71,049	NA
Lives	689,297	552,853	627,647	NA

*As of mid-year for Caroliance; all other enrollment totals are as of year-end.
Lives = Employees plus dependents; NA = Not available
Source: Caroliance enrollment data provided by the State Health Plan Purchasing Alliance Board; outside market enrollment data from the North Carolina Small Employer Group Health Insurance Annual Activity Report 1992-1998, North Carolina Department of Insurance, Life and Health Division.

Findings

Enrollment and Product Choice. Caroliance has struggled to gain market share. Its enrollment has never amounted to more than about 1% of the total small-group market (Table 1), and enrollment has declined substantially from its peak in 1997. Despite the disappointing performance, Caroliance has offered a number of important advantages in terms of availability of and choice in products for hard-to-insure groups. Insurers are leery of covering groups of five or fewer employees because small groups tend to be less profitable (they often put off purchase of health insurance until an expensive health care need is imminent, and the per-person cost of administration and marketing is higher). Table 2 shows that groups purchasing through Caroliance have been primarily in this underserved market segment, and that group size has decreased significantly in recent years.

Groups purchasing new coverage through Caroliance are more likely to have previously been uninsured than groups purchasing new coverage in the outside market. In 1996, 1997, and 1998, more than 50% of new business in Caroliance was with the uninsured (those who had no group coverage in the prior 30 days); this is twice the rate (20-25%) in the outside market. A Caroliance representative suggested that this represented an entry point into the health insurance system for new businesses, since Caroliance was more lenient about how long a business had to be in operation to qualify for coverage. This same representative thought that, once groups have initial coverage, they leave Caroliance for the outside market.

Another notable characteristic of Caroliance is its large proportion of guaranteed-issue business (coverage an insurer must offer to any small group regardless of the group's health status). During its first year, Caroliance reported that 75% of its groups were classified as guaranteed-issue, in contrast to only 4% for the outside market. Since 1997, Caroliance continued to report that 65-70% of its groups were guaranteed-issue, compared to 3% for outside insurers.

Table 2. Comparison of average group size

	1996	1998/99*
Caroliance		
Employees	2.2	1.7
Lives	3.6	2.7
Outside Market		
Employees	5.7	5.1
Lives	10.8	8.8

*As of 8/99 for Caroliance and 12/98 for the outside market; 1996 is as of 12/96
Lives = Employees plus dependents
Source: Caroliance data provided by the State Health Plan Purchasing Alliance Board; outside market enrollment data from the North Carolina Small Employer Group Health Insurance Annual Activity Report 1992-1998, North Carolina Department of Insurance, Life and Health Division.

Caroliance has been able to offer better selections to high-risk groups. North Carolina's original small-group law required that insurers offer two health insurance products to all small groups that applied, regardless of health status. The state-mandated benefits consisted of a basic plan (with minimum benefits) and a standard plan (with benefits approximating traditional indemnity coverage). Premiums were subject to state rating restrictions. When it began operation, Caroliance was allowed to offer only these so-called statutory products, even though they had not been popular because of high cost and a perception of inferior benefits. But Caroliance soon added a "select" product that was comparable to the comprehensive coverage available in the outside market.

Caroliance was required to offer its products to any group interested in buying, although rates for less healthy groups were higher; insurers selling in the outside market had to offer higher-risk groups only the statutory plans. Caroliance thus offered less healthy groups a more attractive benefit package than they could find in the outside market. Caroliance also was more active in marketing its guaranteed-issue products.

Caroliance's advantage largely disappeared in July 1997 with enactment of the Health Insurance Portability and Accountability Act (HIPAA). This federal law requires that insurers offer all their plans, on a guaranteed-issue basis, to groups with 2-50 workers. Thus, some groups who previously were only offered statutory plans could find other plans instead. Indeed, the total number of groups buying statutory plans in the regular market dropped by 22% between 1996 and 1998, and the number of groups buying non-statutory plans rose by 12%.

Caroliance still offers greater choice for the self-employed (also called "groups of one"), who are not covered by the new federal law. North Carolina law requires only that insurers offer the two statutory plans to groups of one, but Caroliance offers the more comprehensive plan as well. However, even this advantage is lessened by the fact that Blue Cross, now the primary insurer in Caroliance, voluntarily issues additional plans to the self-employed purchasing in the outside market.

Caroliance allows individual employees to choose among different insurers and plans, in contrast to the outside market where insurers require small employers to give them all or none of their business. This advantage is diminished, however, by four factors: (1) The employee-choice feature is much less significant to companies with 1-3 workers where there is little distinction between the employer's and the employees' choices (employer and employees may well be part of the same family). (2) Caroliance now has only one insurer operating statewide (Blue Cross). Thus, only the largest cities offer the possibility of a selection of insurers, and even then the selection is very small. (3) Employers can opt out of the employee-choice feature if they pay 70% or more of the premium. And (4) some of the smallest employers find the choice feature burdensome. The Caroliance benefits administrator does not handle claims problems, so this task often falls to the business owner. Having to understand and negotiate the claims systems of multiple carriers can be time-consuming. It has been reported that some very small employers pressure all their employees to choose the same plan for this reason. These four factors have resulted in fewer than 5% of Caroliance groups enroll with more than one insurer.

"Having to understand and negotiate the claims systems of multiple carriers can be time-consuming. It has been reported that some very small employers pressure all their employees to choose the same plan for this reason."

A final notable characteristic of Caroliance is that its subscribers have overwhelmingly chosen fee-for-service plans—indemnity and preferred provider arrangements—over managed health care plans (health-maintenance or point-of-service). In sharp contrast to purchasing cooperatives in other states, where enrollment is overwhelmingly in health-maintenance organizations, more than 80% of Caroliance enrollment has been in indemnity or preferred provider options. This is true for both healthy and sick groups and may reflect the weakness of health maintenance organization provider networks in rural areas. Low enrollment in managed care also may reflect a relatively sicker health status of Caroliance groups, although there is disagreement on this point. Less restrictive fee-for-service plans may attract sicker subscribers, who are more attached to their doctors and are less willing to switch to a new provider in a managed care network.[5]

Premiums. Insurance agents in North Carolina and around the country have told us that small groups are very price-sensitive, and will often switch carriers to save just a few dollars per employee. This is particularly true because of the portability of coverage resulting from state and federal reforms. This puts Caroliance at a clear disadvantage because of its higher rates. Agents say that Caroliance is usually more expensive than outside options, even for policies issued by the same insurer. Some states do not allow insurers to charge more for the same coverage sold through the state's purchasing alliancethan through the outside market, but this is not the case in North Carolina. There are occasional reports of favorable prices through Caroliance (one subject told of a 17% discount), but the prevailing opinion is that, more often than not, healthy groups get better prices in the outside market. This was confirmed by an internal study by Caroliance.

The price differential is driven by the health status of the enrolled population. If Caroliance is to be successful, it needs a strong base of healthy groups who will contribute premiums but not add substantially to medical costs. When there is an imbalance between healthy and less healthy groups, the healthier groups purchase outside because prices are lower;

this causes prices for those remaining to escalate, driving even more healthy groups away. As mentioned previously, Caroliance has appealed to groups that pose higher financial risks for the insurers. These groups are attracted by the select products and the more welcoming response they receive from Caroliance. Some subjects also say these groups are steered to Caroliance by agents trying to protect favored insurers in the outside market from high-cost business, an illegal practice called field underwriting.

Caroliance has been notably unsuccessful in attracting healthy groups. One important reason is the pricing system used by the benefits administrator. Insurers in the outside market use at least three tiers of rates (guaranteed issue, standard, and low risk), and many use five or six tiers, but Caroliance has generally used only two rates (guaranteed issue and standard). This simplifies the underwriting process so that quotes can be provided more quickly, but the negative effect of making fewer risk distinctions is to drive the healthiest groups to the outside market where "preferred" rates may be 20% less than standard rates. Similarly, Caroliance has until recently used blended family rates, which make no distinction based on the number of children in a family. As a result, smaller families have found it cheaper to purchase coverage in the outside market.

The problem of competitive rates is exaggerated by the fees added to the premiums paid by Caroliance subscribers. Each employer group that joins Caroliance must pay an annual membership fee, as well as a monthly administrative fee according to group size. The fees are a revenue source for the regional alliances, but they increase the effective market price at a time when Caroliance is already at a relative disadvantage in the market.

Insurer Participation and Competition. Health insurance purchasing cooperatives became prominent during the early 1990s, at a time of intense discussion about health care reform at the federal and state levels. Many stakeholders and public policy analysts saw alliances as market-based solutions to the growing numbers of uninsured, particularly among employees of small businesses. Alliances were more palatable to various special interests than a government insurance system, which appeared likely if nothing else were done. In North Carolina, as in many other states, the idea of insurance purchasing alliances for small businesses gained bipartisan support among elected officials, and the backing of insurance industry and business groups. Lt. Governor Dennis Wicker championed the idea in Raleigh.

Several major commercial insurers and nonprofit Blue Cross and Blue Shield were involved in early discussions about the design of this new entity. Several for-profit managed care companies publicly supported the alliance concept as it was being formulated. In 1995, 14 health plans requested applications to sign up as "accountable health carriers." However, only six insurers actually completed the enrollment process when Caroliance started selling to small employers in November 1995, and only two offered their products in all six regions of the state. The number of participating insurers subsequently dwindled, so that by mid-1999 only Blue Cross was selling statewide and one other company was selling in a limited region. Only two health maintenance organizations have participated in Caroliance and neither across the whole state.

Various explanations have been offered to explain the low rate of participation by insurers. On the political front, the national push for comprehensive health care reform lost steam with the failure of the Clinton reform plan, so insurers no longer felt compelled to support the alliance as an alternative to government insurance. Blue Cross has continued to participate, perhaps because of its special ties to state government and its history as an institution with a broader social mission. On the business front, insurers have viewed the alliance system with skepticism. They complain that, contrary to predictions, Caroliance has not streamlined the process of enrolling and administering small groups and thus reduced administrative costs. Signing up business through the alliances actually takes more work since the Caroliance products do not mesh well with existing administrative systems. The size of the Caroliance book of business is too small to justify changing the internal systems of insurance companies. They are reluctant to sign up Caroliance business because they see it as high-risk and unprofitable. Some companies do not trust the delegated underwriting decisions made by the Caroliance benefits administrator. Others complain that, despite the attempts of Caroliance to identify an existing risk-adjustment methodology that would satisfy insurers' concerns, no suitable mechanism has been implemented. Companies say that Caroliance discourages healthy customers from purchasing because its underwriting system keeps this segment from getting the fullest allowable discount. Moreover, some insurers see the employee-choice feature as an invitation to adverse selection, since in theory an insurer can be left with the sicker members of a group if the healthier members choose a competing plan.

Marketing and publicity during the startup phase of Caroliance may have scared away some insurers and created the self-fulfilling impression that it has largely high-risk customers. News articles based on press releases emphasized the fact that Caroliance was available for employers who had difficulty finding coverage elsewhere, implying that Caroliance was targeted at high-risk groups. At the same time, the benefits administrator never fully developed a marketing plan that would attract a balanced complement of risks to Caroliance, although this was initially envisioned. Instead, fragmented marketing was carried out by the regional offices. Finally, some insurers reportedly left Caroliance because of unrelated changes in their business strategies. Others, namely managed care plans, say that the lack of physician networks in rural North Carolina is one reason they do not participate.

Health Insurance Agents' Participation. Caroliance has had a mixed reception from health insurance agents. Its relationship with agents got off to a rocky start because Caroliance planners initially considered direct sales. Even after Caroliance made it clear that it welcomed rank-and-file agents and that it would sell only through independent agents, there was strong opposition by managing general agents, who are influential professional leaders. Managing general agents opposed Caroliance because it does not pay them "override" commissions for recruiting and supervising field agents. There also is a perception that state funding gave Caroliance an unfair advantage over the private sector, and that the purchasing cooperative creates more complication and expense by introducing an unnecessary intermediary between insurers and purchasers. Some agents have been afraid that Caroliance would cut them out of the sales loop since nothing in the legislation requires their participation. Agents say that Caroliance premiums are too high, blaming the two-tier rating system mentioned above. One source noted that, even when Caroliance prices are competitive, employers have been swayed toward outside policies by added "perks," such as a small amount of term life insurance thrown in "for free." By law, Caroliance cannot add such incentives to its products or sell anything other than health insurance.

Another deterrent to agents is that, for several years, Caroliance paid commissions of only about 5%, compared to the 8-10% available elsewhere. One observer noted that selling Caroliance policies requires a change in business philosophy from what most agents are used to; money can be made, but it is "fast nickels, rather than slow dimes." Insurers generally view Caroliance business as guaranteed-issue business (even though a portion of it does pass underwriting), so they set their Caroliance commissions at the 5% level to reflect the expected lower profitability of guaranteed-issue products. Insurers also justify lower commissions by saying that it is less work for agents to sell through Caroliance, although some agents disagree, saying that the employee-choice feature confuses employers and employees, and requires agents to spend more time explaining the Caroliance system and handling claims and billing disputes.

Other agents have found Caroliance useful. Many hesitate to bring high-risk business to their favored insurers, and Caroliance provides an easy, alternative coverage for these groups. Agents have found that Caroliance is one of the few places where the self-employed can purchase comprehensive group coverage. Other beneficial aspects are fast rate quotes, easy comparison of products, and the availability of comprehensive, "select" products for higher risk clients. Because of its relative simplicity, Caroliance is reportedly more successful with agents who sell health coverage only occasionally, and so are less knowledgeable about all of the offerings in the market. Also, Caroliance allows agents who are not otherwise registered with an insurer to sell its products.

Discussion

Caroliance's most notable advantage is that, prior to HIPAA, it was the only way that high-risk small groups could get comprehensive coverage. Following enactment of HIPAA, this remains true for the self-employed. Caroliance provides easy comparison shopping, because it sells standardized products and it provides quick quotes through its simplified underwriting system. But Caroliance has not succeeded in attracting a large enrollment, offering lower prices, providing a broad selection of insurers, or providing quality-based comparison measures. Instead it has functioned as a *de facto* high-risk pool for groups that the outside market wants to avoid: the sick, very small groups, and new businesses.

In its fifth year of sales, Caroliance is struggling to survive. It has made significant changes in its operations in order to be more efficient, enhance its revenue (it is no longer subsidized by the state) and appeal more to insurers, agents and the healthier groups it needs. It has consolidated the regional alliances into one statewide alliance. It has raised administrative fees charged to member small employers. It has implemented a five-tier underwriting/rating system that recognizes more gradations of health status and thus gives lower rates to healthier groups. (Some informed observers speculate that Caroliance will never be able to offer quotes for prime business as low as the outside market, because insurers, leery of getting too many less-healthy clients through Caroliance, inflate their Caroliance rates to account for the expected higher costs. This practice is of questionable legality, since rating rules require insurers to use the same rating structure for all of their small-group business.) Rates for families are now tiered to account for differences in family size. Caroliance has agreed to allow Blue Cross to sell not only the standardized products but also some custom Blue Cross products, which the insurer says will be more administratively efficient for it to sell.

In making concessions about rates and product lines, Caroliance has reluctantly given up some of its distinctive features and succumbed to the realities of the market's current structure. Instead of reforming the market, Caroliance has largely come to mimic the market. But even with these adjustments, a large increase in enrollment seems unlikely as long as the basic market rules remain unchanged. National observers of health insurance purchasing cooperatives have noted that there is no inherent advantage to insurers to "put themselves in the kind of direct head-to-head competition" that participation in a purchasing cooperative involves. Until market rules mandate the sale of small-group insurance through a collective arrangement,[6] it is unlikely that Caroliance will have the clout to attract more insurers. In the current environment, insurers can influence healthier groups to purchase products outside Caroliance because flexible rating rules allow lower rates for comparable products purchased outside the alliance, and because of allowed variations such as commissions and product selection.

Conclusion

Caroliance has improved and made accessible the health insurance packages offered to high-risk small groups. However, North Carolina's health insurance purchasing cooperative has not harnessed the power of group purchasing to bring down premiums or to effect other improvements for all small-group purchasers. The rate of non-insurance among small-group workers in North Carolina has not dropped since Caroliance began operating. The challenge is to find ways to make coverage more affordable for all small-group workers and their families, especially those who have been priced out of the market.

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Note: Since this article was prepared for publication, the authors have been informed that the Caroliance operation will be closing as of December 31, 2000.

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Carolina Physician's Bookshelf

Edward C. Halperin, MD, Book Review Editor

Time to Heal: American Medical Education from the Turn of the Century to the Era of Managed Care
by Kenneth M. Ludmerer
Oxford University Press, 1999. $29.95.

Reviewed by Conrad C. Fulkerson, MD

This massive yet highly approachable book offers a clear, authoritative view of US medicine today. It brings remarkable focus to the strong and undeniable feeling that something in the house of medicine has gone seriously awry.

How often have we physicians tried to tell patients, friends, or colleagues that American medicine is in imminent danger? And how often have we struggled to speak about what is often little more than an intuitive conviction? We can recite the worrisome examples, events, and changes in medicine, but, listening to ourselves, we wonder whether we are just whining about small, incremental "corrections" or "restructurings" or "reforms." Dr. Ludmerer's perspective, documentation, and brilliant intellect leave no doubt that we are witnessing a massive, accelerating change in medicine. He profoundly confirms our intuition: we are in the midst of the greatest crisis to confront our profession in at least a century.

True, in recent years there has been no lack of discussion about and criticism (constructive and otherwise) of medicine. Rarely, however, has the conversation risen beyond the cacophony of shallow self-interest. Until now. Ludmerer superbly weaves together his experience as a physician, as an educator and academician, and as a historian to construct a vivid "big picture" view of the problems with which we struggle. He emerges from the pages in the guise of what the anthropologists call an "informant" – some one who knows a culture intimately and can articulately communicate that culture to others.

Ludmerer traces American medical education from the late 19th century through the end of the 20th. His extensive references build a cumulative credibility and authority without detracting from what is a totally engaging story of how American medicine moved from 19th century proprietary medical schools, through the sea change of the Flexner report, to the construction of a massive system of education, research, and care unparalleled in history, medical or otherwise. Ludmerer integrates the story into the background of the times with great skill, portraying the periods before, during and after World War II; the ascendancy of research; the rise of Medicare and Medicaid; the civil rights movement; our changing life patterns and demographics, and the decades of economic abundance culminating in a frontal assault on ever-rising medical costs. In describing the era of managed care, he carefully delineates parallels as well as differences with the era of proprietary medicine in the late 1800s.

Throughout the historical review he interweaves the stories of the people and places that exemplify the 20th century in American medicine: the great medical centers, the pioneer researchers, the venerated professors and teachers. He describes medical student life and the rise of postgraduate medical education. These accounts, drawn from historical documents, are well-referenced, aptly annotated, and easily accessible to the reader. Overall, I found this a thrilling, sometimes nostalgic, and always readable account. The reading has given me a profoundly richer understanding of the "good old days," many of which, it seems, *are* worthy of fond remembering.

Coming to the last few decades and the recognizable beginnings of today's turmoil, Ludmerer's balanced picture of contributing forces and issues further strengthens the authority of his work. Medicine came to rely on having ever-increasing resources. When these began to dwindle, academic medical centers undertook the relentless pursuit of revenue from clinical services, neglecting medical education and research and failing to be keenly vigilant about the quality of care and patients' interests. Society, with some justification, recanted its implicit contract with academic medical centers to educate the kind of physicians needed by society, to guard the quality of care, and to further knowledge. Ludemer's central theme – that society has a social contract with the enterprise of medicine – carries through the book and provides the organizing principle that gives this work true and credible perspective. The principle of the social contract and the idea of medicine as a public trust also offer a blueprint for future action needed to preserve medicine's quality, integrity, and value to the public.

This book is not aimed solely at medical educators, academicians, or the political leaders of organized medicine, although it certainly does speak to them. Ludmerer makes a convincing argument that "medical education and medical practice are inextricably linked," that the academic center is every physician's "family of origin," shaping our values, our skills, and our attitudes, and laying the foundation for our professional lives. A vigorous, responsible academic center can discover new treatments, provide continuing education, train the new generations of men and women to whom we will entrust our patients and ourselves, and, as they have for more than one hundred years, assist in the care of the most challenging and complex diseases. The dilemma faced by modern academic medical centers is the story of our professional culture and family – so, it is *our* story. The crises of medical education are our crises. That perspective makes this not just a book for completed physicians, but one for current medical students and other health professionals. When I discussed it recently with a group of medical educators, one proposed that every medical student read and discuss it in the course of his or her undergraduate studies.

Some additional notes: *Time to Heal* has 400 pages of text and 100 pages of references and notations. The latter are especially accessible because the top of each reference page notes the pages of text to which the references are linked. It is the most reader-friendly academic treatise that I have read. The writing is lively, articulate, and entertaining.

Dr. Ludmerer is no ivory-tower pontificator. For example, amidst the huge concepts such as the social contract between medicine and society, the day-to-day life of students and physicians is regularly and thoughtfully addressed. The author's position – that there is an absolute need for adequate time to learn, to reflect, and to provide patient care – is amply developed. And Dr. Ludmerer recognizes that we have probably exceeded the limits in squeezing down the time needed for quality learning and practice.

I strongly recommend *Time to Heal* to all physicians, students, leaders and policy-makers in medicine. This book would be a wonderful vehicle for discussion at medical society meetings, a superb gift for a colleague or a student – or any thoughtful observer of the American health care scene – and an absolute necessity for the library of any practice or hospital. Kenneth Ludmerer shows us where we've been, outlines the internal and external forces that have shaped our profession, and clarifies the nature of our current turmoil. He helps us to look at ourselves in a way that actually lets us see ourselves. His meticulous analysis is strengthened by the map it provides for a future of quality medical education and care – and the pitfalls that await if we delay.

Briefly Noted

How We Believe: The Search for God in an Age of Science

By Michael Shermer
New York, NY: W. H. Freeman and Co., 2000. $24.95.

I saw a brief notice for this book in Scientific American and went out and picked up a copy. Michael Shermer, the author, has gone through multiple crises of faith in his life. He has been, at various times, a skeptic, a born-again Christian, an atheist, and an agnostic.

Whatever Shermer's beliefs at the moment, they don't inappropriately influence this book. He provides the reader with a fair-minded review of the arguments for and against the existence of God. Furthermore, he considers how these arguments might be modified or interpreted as a function of objective knowledge and the scientific age. In essence, Shermer argues that one has no right or intellectual justification to resort to "scientific" explanations for the existence or nonexistence of god. If one chooses to believe in God because of faith, well and good. One should not, however, argue that our current understanding of astronomy, biology, or chemistry provides some justification for a believe in a divine purpose and a supreme being.

I think physicians who grapple with issues of faith and belief, in either their personal or their medical lives, will find this book well worth the investment in time. – ECH

Anesthesiology in the Academic Medical Center: Place and Promise at the Start of the New Millennium.

By J. G. Reves, MD, and N. M. Greene, MD
Philadelphia, PA: Lippincott Williams and Wilkins, 2000. International Anesthesiology Clinics Series, No. 38(2), Spring 2000. $66.00

Did you ever read a book and wonder what the author majored in in college? After reading this carefully crafted and thoroughly well-written book, in which each paragraph begins with an unequivocal topic sentence, I couldn't help but wonder who trained Reves and Greene as writers. You'll find no flowery prose here, or sweeping statements. Rather, this is a working document which carefully reviews the role of anesthesiology in the academic medical center, research funding for the discipline, manpower decisions, and funding issues for the specialty.

One of the more interesting sections of the book considers the role of leadership in the academic medical department and the future of academic medicine. Based on a 25-year-old book by Greene, Reves and Greene have updated and expanded the initial work. This little monograph will interest both anesthesiologists and other academic physicians. (By the way, Reves majored in English.) – ECH

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CME Calendar

November 11

Primary Care Management of Orthopaedics: When to Treat and When to Refer?

Place: Friday Center, UNC-Chapel Hill
Credit: Up to 3.5 hours, Category 1, AMA
Fee: $75
Info: UNC Office of CME, 919/962-2118.

December 10-12

Emergency Ultrasound Course

Place: Columbia, SC
Credit: Up to 21 hours, Category 1, AMA; 21 hours, Category 1, ACEP
Fees: $700 physicians; $650 ACEP; $600 SCCEP; $500 residents and PAs; $450 students
Info: South Carolina College of Emergency Medicine; Thomas D. Cook, MD, 145 Sassafras Tr., Lexington, SC; *email*: huntpat@sc.rr.com; *website*: www.emergencyultrasound.com

December 12-13

The Great Divide: Understanding and Eliminating Health Disparities

Place: Sheraton Capital Center, Raleigh
Credit: TBA
Fees: TBA
Info: UNC School of Public Health, 919/966-4032; or www.sph.unc.edu/oce

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[1] Lancet 1994; 343:692-695 / [2] Journal of Clinical Oncology 1998; 16:2417-2425.

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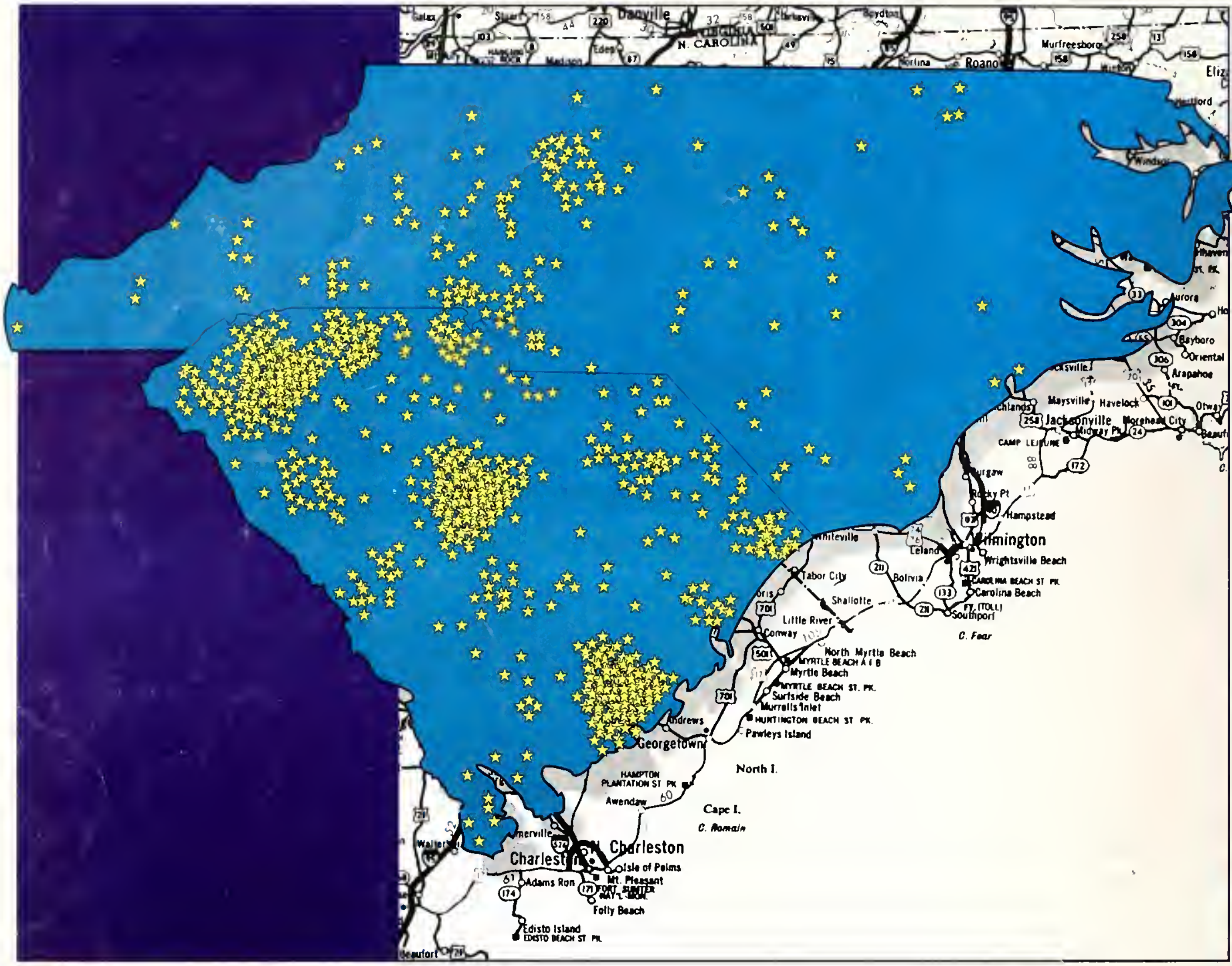

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March 2000

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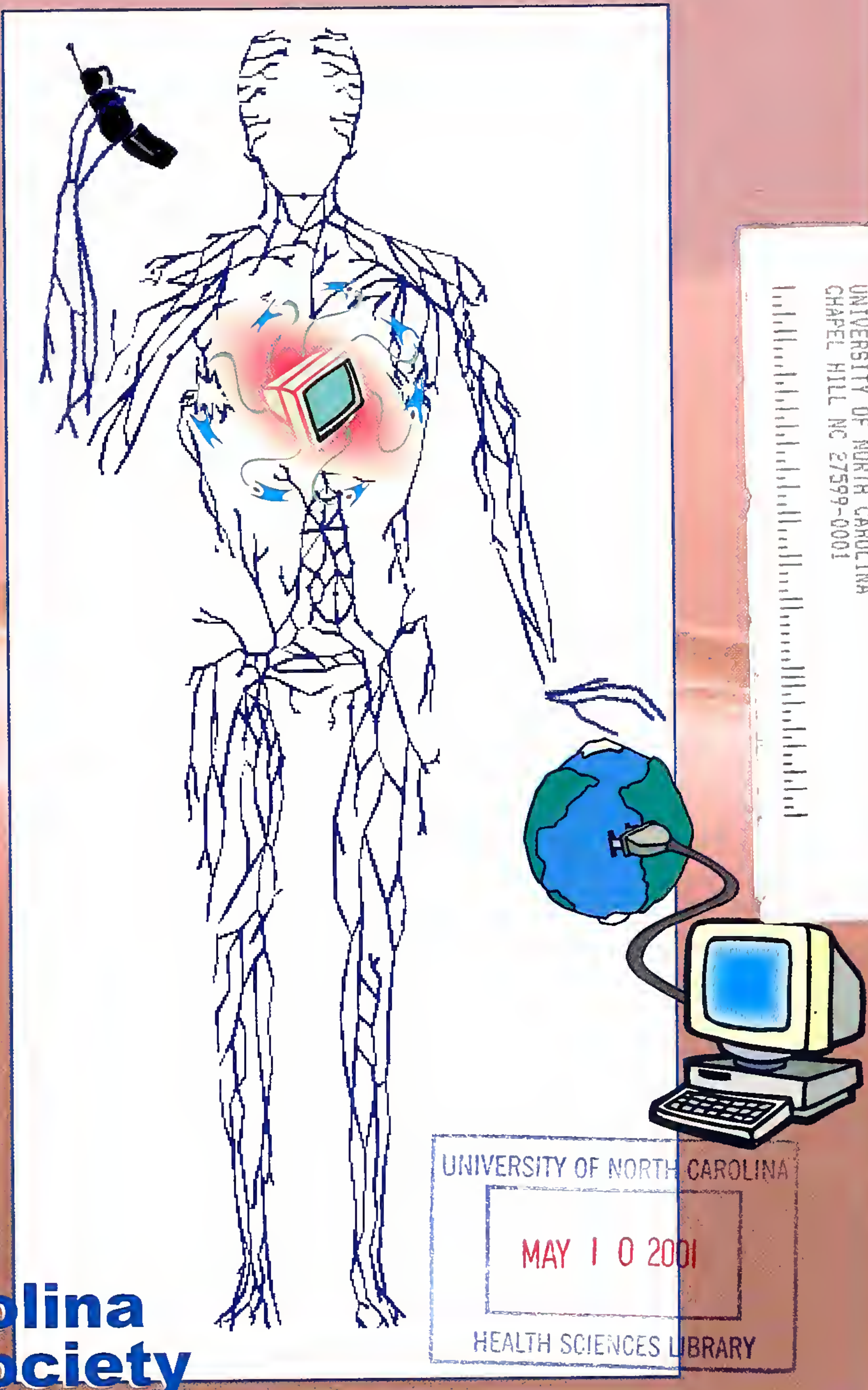
A Compilation of Elected Leaders and Committee Members/Chairs



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North Carolina Medical Society

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2000 MEETING DATES

NCMS Executive Committee .... April 15, NCMS Headquarters, Raleigh
July 22, NCMS Headquarters, Raleigh
September 23, NCMS Headquarters, Raleigh

NCMS Executive Council .... April 16, NCMS Headquarters, Raleigh
September 24, NCMS Headquarters, Raleigh

NCMS Committee Conclave .... March 16-17, Embassy Suites, Cary

NCMS Annual Meeting .... November 9-12, Grandover Resort, Greensboro

AMA .... June 9-15, Chicago Hilton, Chicago, IL (Annual Meeting)
December 1-6, Marriott Orlando World Center, Orlando, FL (Interim Meeting)
March 25-28 – Fontaine Bleu Hotel, Miami, FL (AMA Leadership)

Leadership Roster

North Carolina Medical Society

2000

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This information is correct according to North Carolina Medical Society records on February 11, 2000.

OFFICERS

(Officers are Voting Members of both the Executive Council and Executive Committee)

President	Don C. Chaplin, MD, 1234 Huffman Mill Rd., Burlington 27215 (336-538-1234)(E-Mail: donchaplin@compuserve.com)
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First Vice-President	Ronald H. Levine, MD, 2404 White Oak Rd., Raleigh 27609 (919-782-0838)(E-Mail: ron.levine@sph.unc.edu)
Second Vice-President	P. William Aycock, Jr., MD, 660 Summit Crossing Place, Ste. 201, Gastonia 28054 (704-867-0735)(E-Mail: pwamd@aol.com)
Secretary-Treasurer	Charles F. Willson, MD, Brody School of Medicine, Dept. of Pediatrics, Brody Bldg., 3E139, Greenville 27858-4354(252-816-3221) (E-Mail: cwillson@pcmh.com)
Speaker	Jeffrey W. Runge, MD, Carolinas Medical Center, PO Box 32861, Charlotte 28232-2861 (704-355-7092)(E-Mail: jrunge@carolinas.org)
Vice-Speaker	Richard F. Bruch, MD, 2609 N. Duke St., Ste. 900, Durham 27704 (919-220-5255)(E-Mail: rbruch@attglobal.net)
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Executive Vice President, CEO	Robert W. Seligson, PO Box 27167, Raleigh 27611 (919-833-3836)(E-Mail: rseligson@ncmedsoc.org)

COUNCILORS AND VICE-COUNCILORS

(Councilors are Voting Members of the Executive Council -- Vice-Councilors are Non-Voting Members.)

First District-- Councilor	Lindsey L. White, MD, 111-B Medical Dr., Elizabeth City 27909 (252-331-1100)(2000)
Vice-Councilor	Robert E. Lane, MD, 600 S. Church St., Hertford 27944 (252-426-5711)(2000)
Second District-- Councilor	Neil C. Bender, MD, PO Box 68, Pollocksville 28573 (252-633-1010)(2001)(E-Mail: bendermd@aol.com)
Vice-Councilor	Michael R. Towarnicky, MD, PO Box 68, Pollocksville 28573-0068 (252-633-1010)(2001)
Third District-- Councilor	Lindsey E. deGuehery, MD, 1812 Glendale Dr., Wilson 27893 (252-291-5864)(2000)(E-Mail: breatheg@unc.edu.com)
Vice-Councilor	W. James Stackhouse, MD, 201 Cox Blvd., Goldsboro 27534 (919-734-9455)(2000)(E-Mail: jim@stackhouse.com)
Fourth District-- Councilor	Michael P. Moulton, MD, 106 Oxmoor Place, Wilmington 28403-6306 (910-452-1400)(2001)(E-Mail: mmoul17071@aol.com)
Vice-Councilor	Brent D. Wright, MD, 2131 S. 17th St., PO Box 9025, Wilmington 28402-9025 (910-762-9093)(2001)
Fifth District-- Councilor	Robert A. Krause, MD, 11 Office Park Dr., Jacksonville 28540 (910-353-9906)(2000)(E-Mail: rkrausemd@grbralter.net)
Vice-Councilor	Richard G. Juberg, MD, 400 E. "H" Street, Erwin 28339 (910-897-5521)(2000)
Sixth District-- Councilor	Edward C. Bratzke, MD, 6131 Falls of the Neuse Rd., Ste. 200, Raleigh 27609 (2001)(E-Mail: ebratzke@mindspring.com)
Vice-Councilor	David H. Gremillion, MD, 3024 New Bern Ave., Raleigh 27610 (919-250-8520)(2001)
Seventh District-- Councilor	Bradford B. Walters, MD, 32 Wedgewood Rd., Chapel Hill 27514-7060 (919-966-1374)(2000)(E-Mail: medbbw@med.unc.edu)
Vice-Councilor	Jennifer T. Fortney, MD, 2 Scott Place, Durham 27705 (919-681-6390)(2000)(E-Mail: fortn001@mc.duke.edu)
Eighth District-- Councilor	Zane T. Walsh, Jr., MD, 2810 Huntington Rd., Fayetteville 28303 (910-323-9010)(2001) (E-Mail: zwalsh@mail.apcnet.com)
Vice-Councilor	Robert A. Appel, MD, 1786 Metromedical Dr., Fayetteville 28304 (910-485-8151)(2001)(E-Mail: wahoos99@aol.com)
Ninth District-- Councilor	Byron J. Hoffman, Jr., MD, 421 N. Holly Ave., Siler City 27344 (919-663-3360)(2000)
Vice-Councilor	James B. Patterson, MD, 1638 Memorial Dr., Burlington 27215 (336-226-8000)(2000)(E-Mail: aladerm@netpath.net)
Tenth District-- Councilor	Thomas E. Jarrett, MD, 624 Quaker Lane #205A, High Point 27262-3893 (336-841-6711)(2001)
Vice-Councilor	Matthew B. Martin, MD, 1002 N. Church St., Ste. 302, Greensboro 27401-1305 (336-275-8415)(2001)(E-Mail: martex54@aol.com)
Eleventh District-- Councilor	David R. Carr, MD, 2915 Lyndhurst Ave., Winston-Salem 27103 (336-765-5221)(2000)
Vice-Councilor	Wesley Covitz, MD, Wake Forest Univ. Physicians, Medical Center Blvd., Winston-Salem 27157(336-716-4627)(2000) (E-Mail: wcovitz@wfubmc.edu)
Twelfth District-- Councilor	A. Gray Bullard, MD, 103 Country Club Dr., Concord 28025 (704-795-2198)(2001)(E-Mail: cabarruslung@prodigy.com)
Vice-Councilor	William M. Johnstone, Jr., MD, 1 Memorial Dr., PO Box 2000, Pinehurst 28374 (910-295-0861)(2001)(E-Mail: dublue@aol.com)
*Thirteenth District-- Councilor	Charles B. Rich, MD, 200 S. College St., Ste. 400, Charlotte 28202-2005 (704-365-0760)(2000)(E-Mail: mlrich@aol.com)
Vice-Councilor	Dale R. Shaw, MD, 3030 Latrobe Dr., Charlotte 28211 (704-362-1945)(2000)
Fourteenth District-- Councilor	Dale M. Mandel, MD, 1219 Lexington Ave., Ste. A, Thomasville 27360-3416 (336-475-7148)(2001) (E-Mail: dmmandel@aol.com)
Vice-Councilor	Mark L. Appler, MD, 865 Westlake Dr., Mt. Airy 27030-2124 (336-719-6100)(2001)
Fifteenth District-- Councilor	Philip J. Schmitt, MD, 1095 25th Ave. Dr., NW, Hickory 28601 (828-327-7888)(2000)
Vice-Councilor	Ronald N. Locke, MD, 3412 Graystone Place, Conover 28613 (828-322-9105)(2000)
*Sixteenth District-- Councilor	Douglas D. Sheets, MD, Tryon Rd., PO Box 1208, Rutherfordton 28139 (828-287-7383)(2001)(E-Mail: dsheets@rfci.net)
Vice-Councilor	Thomas D. Bailey, MD, 1807 Arbor Way Dr., Shelby 28150-6166 (704-482-6767)(2001)(E-Mail: rdbtwn@aol.com)
Seventeenth District-- Councilor	S. Eugene Kirkley, MD, 518 6th Ave. W., Hendersonville 28739-3502 (828-697-7805)(2000)
Vice-Councilor	Albert J. Osbahr, MD, 576 LeRoy George Dr., Bldg. 1, Clyde 28721 (828-452-8361)(2000)
Eighteenth District-- Councilor	Donald W. Russell, MD, 390 S. French Broad Ave., Asheville 28801 (828-254-5366)(2001)
Vice-Councilor	Eric W. Peterson, MD, PO Box 1718, Asheville 28802 (828-252-3375)(2001)
Nineteenth District-- Councilor	R. Lee West, MD, Brody School of Medicine, Dept. of Pathology, Brody 7510, Greenville 27858-4354 (252-816-5911)(2000) (E-Mail: rdbtwn@aol.com)
Vice-Councilor	Dawn S. Brezina, MD, 210 Bristol Court, Greenville 27834-4354 (252-321-0586)(2000)(E-Mail: dwnbrezina@aol.com)

*Voting Member of the Executive Committee

DELEGATES TO THE AMERICAN MEDICAL ASSOCIATION

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Henry J. Carr, Jr., MD, *Chair* .... 100 Badger Ct., Clinton 28328 (January 1, 1999-December 31, 2000)
Elizabeth P. Kanof, MD .... 2404 White Oak Rd., Raleigh 27609 (January 1, 1999-December 31, 2000)
H. David Bruton, MD .... NC Dept. of Health & Human Services, 2001 Mail Service Center, Raleigh 27699-2001 (January 1, 2000-December 31, 2001)
(E-Mail: glenda.parker@ncmail.net)
Don C. Chaplin, MD .... 1234 Huffman Mill Rd., Burlington 27215 (January 1, 2000-December 31, 2001) (E-Mail: donchaplin@compuserve.com)
John A. Fagg, MD .... 2901 Maplewood Ave., Winston-Salem 27103 (January 1, 2000-December 31, 2001) (E-Mail: jafmd@aol.com)
Carolyn R. Ferree, MD .... Wake Forest University School of Medicine, Medical Center Blvd., Winston-Salem 27157
.... (January 1, 2000-December 31, 2001) E-Mail: cferree@wfubmc.edu)
Charles L. Garrett, Jr., MD .... Onslow Memorial Hospital, PO Box 1358, Jacksonville 28541 (January 1, 1999-December 31, 2000)
(E-Mail: medxam@onslowonline.net)
F. Maxton Mauney, Jr., MD .... 2316 Sterling Green Dr., Morrisville 27560 (January 1, 1999-December 31, 2000) (E-Mail: macman8888@aol.com)

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(2 year term)

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Darlyne Menscer, MD .... PO Box 32861, Charlotte 28232 (January 1, 2000-December 31, 2001)(E-Mail: dmenscer@carolinas.org)
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Carol Ann Rupe .... 3201 Mill Pond Rd., Charlotte 28226 (January 1, 1999-December 31, 2000) (E-Mail: stboniface@aol.com)
Carl K. Rust, II, MD .... 1331 Landfall Dr., Wilmington 28405 (January 1, 2000-December 31, 2001)(E-Mail: ckrust@aol.com)
Charles F. Willson, MD .... Brody School of Medicine, Dept. of Pediatrics, Brody Bldg., 3E139, Greenville 27858-4354(January 1, 2000-December 31, 2001)
(E-Mail: cwillson@pcmh.com)

SPECIALTY SOCIETY ORGANIZATION PRESIDENTS

NC Society of Anesthesiologists .... David A. Crews, MD, 17 Lock Ridge Lane, Greensboro 27408 (336-299-6333)(E-Mail: dc818@aol.com)
North Carolina Society of Asthma, Allergy and Clinical Immunology .... Joseph T. Inglefield, III, MD, 1206 Fairgrove Church Rd.,Hickory 28602-9803 (828-465-7248)
(E-Mail: jinglefield@wheezy.com)
NC Dermatology Association .... Zoe D. Draelos, MD, 115-B Gatewood Avenue, High Point 27262 (336-841-2040)
NC College of Emergency Physicians .... Greg Mears, MD, 4314 Klein Drive, Durham 27705 (919-966-5643)
NC Society of Eye Physicians and Surgeons.......... Cynthia A. Hampton, MD, 451 Ruin Creek Rd., Ste. 204, Henderson 27536 (252-492-8021)(E-Mail: whampton@gloryroad.net)
NC Academy of Family Physicians .... L. Allen Dobson, MD, PO Box 1058, Mt. Pleasant 28124 (704-436-6521)
NC College of Internal Medicine .... Rex M. McCallum, MD, Duke University Medical Center, Box 2954, Durham 27710 (919-684-8763)
NC Neurological Society .... Michael H. Bowman, MD, 4207 Lake Boone Tr., Ste. 200, Raleigh 27607-6520 (919-782-3456)
NC Neurosurgical Society .... Allen H. Friedman, MD, Duke University Medical Center, Box 3807, Durham 27710 (919-681-6421)(E-Mail: fried010@mc.duke.edu)
NC Obstetrical and Gynecological Society .... Frank N.H. Harrison, MD, Carolinas Medical Center, Dept. of OB/GYN,Charlotte 28232 (704-355-3153)
(E-Mail: fharrison@carolinas.org)
Carolinas Occupational and Environmental Medical Association .... Michael Alday, MD, Regional Center for Occupational Medicine, 101 East Wood Street, Spartanburg, SC 29303
NC Orthopaedic Association .... Donald K. Bynum, MD, UNC, Dept. of Orthopaedics, 250 Burnett-Womack, 229H Chapel Hill 27599 (919-966-9079)
(E-Mail: dkbhands@med.unc.edu)
NC Society of Otolaryngology and Head and Neck Surgery .... Peter G. Chikes, MD, 200 Medical Park Dr., Ste. 320, Concord 28025 (704-782-2166)(E-Mail: chnspgc@ctc.net)
NC Society of Pathologists .... Paula Szypko, MD, PO Box 5001, High Point 27262 (336-884-6064)
NC Pediatric Society .... Jane M. Foy, MD, Dept. of Pediatrics, Wake Forest University School of Medicine, Medical Center Blvd., Winston-Salem 27157 (336-727-8105)
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(E-Mail: chris.ullrich@worldner.att.net)
NC Chapter, American College of Surgeons .... Rollin S. Burhans, MD, PO Box 15698, Durham 27704 (919-479-4400)(E-Mail: burhans@mindspring.com)
NC Urological Association .... Thomas C. Leitner, MD, 1428 Ellen St., Monroe 28112-5173 (704-289-4361)

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SPECIALTY CODING

A	Allergy
ADL	Adolescent Medicine
ADM	Addiction Medicine
ADP	Adolescent Psychiatry
AI	Allergy & Immunology
ALD	Alcohol & Drug Abuse
ALI	Allergy & Immunology/Cli. & Lab. Immunology
AM	Aerospace Medicine
AMM	Administrative Medicine
AN	Anesthesiology
APM	Pain Management-Anesthesiology
ARO	Adult Reconstructive Orthopaedics
AS	Abdominal Surgery
ATP	Anatomical Pathology
BBK	Blood Banking/Transfusion
C	Cardiology
CBG	Clinical Biochemical Genetics
CCA	Critical Care Medicine - Anesthesiology
CCG	Clinical Cytogenetics
CCM	Critical Care Medicine - Internal Medicine
CCN	Critical Care Medicine - Neurological Surgery
CCO	Critical Care Medicine -OB-GYN
CCP	Critical Care Medicine - Pediatric
CCS	Critical Care Medicine - Surgery
CD	Cardiovascular Diseases
CDS	Cardiovascular Surgery
CG	Clinical Genetics
CHN	Child Neurology
CHP	Child and Adolescent Psychiatry
CLP	Clinical Pathology
CMG	Clinical Molecular Genetics
CMP	Chemical Pathology
CN	Clinical Neuro-Physiology
CNP	Clinical Neuro-Pathology
CRS	Colon and Rectal Surgery
CS	Cosmetic Surgery
CVT	Cardiothoracic & Vascular
D	Dermatology
DDL	Clinical/Laboratory Dermatological Immunology
DIA	Diabetes
DLI	Diagnostic Lab. Immunology
DMP	Dermatopathology
DR	Diagnostic Radiology
EM	Emergency Medicine
END	Endocrinology, Diabetes & Metabolism
ESM	Sports Medicine-Emergency Medicine
ETX	Medical Toxicology-Emergency Medicine
FOP	Forensic Pathology
FP	Family Practice
FPG	Geriatric Medicine-Family Practice
FPS	Facial Plastic Surgery
FPY	Forensic Psychiatry
FSM	Sports Medicine-Family Practice
GE	Gastroenterology
GER	Geriatrics
GO	Gynecological Oncology
GPM	General Preventive Medicine
GS	General Surgery
GYN	Gynecology
HEM	Hematology-Internal Medicine
HEP	Hepatology
HMP	Hematology/Pathology
HNS	Hand and Neck Surgery
HSO	Hand Surgery-Orthopedic Surgery
HSP	Surgery of the Hand-Plastic Surgery
HSS	Hand Surgery-Surgery
HYP	Hypnosis
ICE	Cardiac Electrophysiology
ID	Infectious Disease
IG	Immunology
ILI	Clinical/Lab. Immunology-Internal Medicine
IM	Internal Medicine
IMG	Geriatric Medicine-Internal Medicine
IND	Industrial Medicine
ISM	Sports Medicine-Internal Medicine
LM	Legal Medicine
MFM	Maternal and Fetal Medicine
MFS	Maxillofacial Surgery
MG	Medical Genetics
MM	Medical Microbiology
MO	Musculoskeletal Oncology
N	Neurology
NEP	Nephrology
NER	Neuro Radiology
NM	Nuclear Medicine
NP	Neuro Pathology
NPM	Neonatal-Perinatal Medicine
NR	Nuclear Radiology
NS	Neurological Surgery
NSP	Pediatric Surgery-Neurology
NTR	Nutrition
OBG	Obstetrics and Gynecology
OBS	Obstetrics
OM	Occupational Medicine
OMO	Orthopedic Musculoskeletal Oncology
ON	Oncology
OP	Pediatric Orthopedics
OPH	Ophthalmology
ORAL	Oral Surgery
ORS	Orthopedic Surgery
OS	Other Specialty
OSM	Orthopedic-Sports Medicine
OSS	Orthopedic Surgery of the Spine
OT	Otology
OTO	Otolaryngology
OTR	Orthopedic Surgery-Trauma
P	Psychiatry
PA	Clinical Pharmacology
PCP	Cytopathology
PD	Pediatrics
PDA	Pediatric Allergy
PDC	Pediatric Cardiology
PDE	Pediatric Endocrinology
PDG	Pediatric Gastroenterology
PDO	Pediatric Otolaryngology
PDP	Pediatric Pulmonology
PDR	Pediatric Radiology
PDS	Pediatric Surgery
PDT	Pediatric Medical Toxicology
PDU	Pediatric Urology
PEM	Pediatric Emergency Medicine
PH	Public Health
PHO	Pediatric Hematology-Oncology
PIP	Immunopathology
PLI	Clinical/Laboratory Immunology-Pediatrics
PMD	Pain Medicine
PMR	Physical Medicine and Rehabilitation
PN	Pediatric Nephrology
PO	Pediatric Ophthalmology
PP	Pediatric Pathology
PPR	Pediatric Rheumatology
PS	Plastic Surgery
PSM	Pediatric Sports Medicine
PTH	Pathology
PUD	Pulmonary Disease
PYA	Psychoanalysis
PYG	Geriatric Psychiatry
PYM	Psychosomatic Med
R	Radiology
REN	Reproductive Endocrinology
RHU	Rheumatology
RIP	Radioisotopic Pathology
RO	Radiation Oncology
RP	Radiological Physics
SM	Sports Medicine
SRS	Spinal Reconstructive Surgery
TR	Therapeutic Radiology
TRS	Traumatic Surgery
TS	Thoracic Surgery
U	Urology
UM	Underseas Medicine
VIR	Vascular and Interventional Radiology
VS	Vascular Surgery

COMMITTEE AND COMMISSION APPOINTMENTS

The committees listed herein have been authorized by President Don C. Chaplin, MD, and/or as required under the Constitution and Bylaws and the Procedure and Policy Manual. Particular note should be taken of the authorization of the House of Delegates of a commission form of organization activity and that all committees except, COORDINATING COUNCIL OF SPECIALTY SOCIETIES, CREDENTIALS COMMITTEE, EVALUATION COMMITTEE, FINANCE COMMITTEE, LEGISLATION COMMITTEE, MEDIATION COMMITTEE, NOMINATING COMMITTEE, and PLANNING COUNCIL are segregated under the respective commission in which the function of the committee logically rests. This will tend to eliminate overlapping and duplication in activity programs and result in coordination of the work of the Society in a manner to lessen the work of the Delegates during the Annual Meeting of the House of Delegates.

I. FAMILY HEALTH COMMISSION

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   Staff: Pam Highsmith -- Committee No. 1

2. **Children and Youth Committee (I-2)**
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   Staff: Carole Miller -- Committee No. 4

3. **Domestic Violence Committee (I-3)**
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   Staff: Don Wall -- Committee No. 9

4. **Women's Health Committee (I-4)**
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II. COMMUNITY HEALTH COMMISSION

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2. **Injury Control Committee (II-2)**
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   Staff: Alan Skipper, Karla Gibbs -- Committee No. 25

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2. **Prevention and Public Health Committee (III-2)**
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3. **Substance Abuse Committee (III-3)**
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   Staff: Debra Griffith -- Committee No. 26

4. **Tobacco Control Committee (III-4)**
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   Staff: Ann Hale -- Committee No. 2

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3. **N. C. Industrial Commission Liaison Committee (V-3)**
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3. **Evaluation Committee**
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(FAX 919-968-7229) American Heart Association,
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28. **Women's Health Committee I-4 (13)**

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29. **North Carolina Medical Journal Task Force (9)**

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30. **Access to Health Care Task Force (16)**

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COUNCILOR DISTRICTS

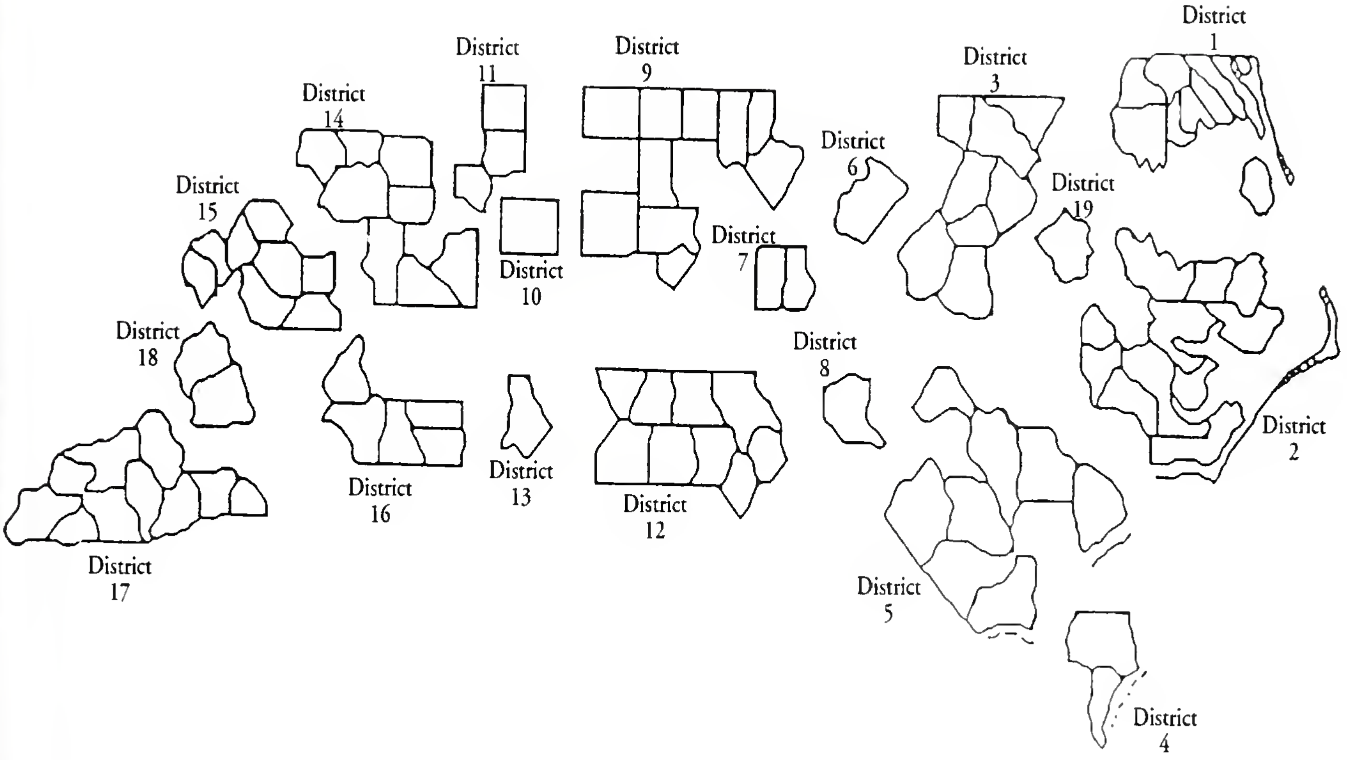
Constitution and Bylaws of the North Carolina Medical Society
Article VIII — Sections, Districts and District Societies

The House of Delegates, in order to promote the purposes of the Society, shall provide for the organization of councilor districts and for the designation of scientific sections. It may provide for the organization of district societies composed of members of component societies.

Chapter VII — Councilor Districts

Section 1. The State of North Carolina is divided by counties into nineteen councilor districts as follows:

District
1 .... Bertie-Gates-Hertford, Chowan-Perquimans, and Pasquotank-Camden-Currituck-Dare
2 .... Beaufort-Hyde-Martin-Washington-Tyrrell, Carteret, Craven-Pamlico-Jones, and Lenoir-Greene
3 .... Edgecombe, Halifax-Northampton, Johnston, Nash, Warren, Wayne, and Wilson
4 .... New Hanover-Pender
5 .... Bladen, Brunswick, Columbus, Duplin, Harnett, Onslow, Robeson, and Sampson
6 .... Wake
7 .... Durham-Orange
8 .... Cumberland
9 .... Alamance-Caswell, Chatham, Franklin, Granville, Lee, Person, Randolph, Rockingham, and Vance
10 ...... Guilford (Greensboro and High Point)
11 ...... Forsyth-Stokes-Davie
12 ...... Anson, Cabarrus, Hoke, Montgomery, Moore, Richmond, Scotland, Stanly, and Union
13 ...... Mecklenburg
14 ...... Ashe, Davidson, Iredell, Rowan, Surry-Yadkin-Alleghany, and Wilkes
15 ...... Alexander, Avery, Burke, Caldwell, Catawba, Mitchell-Yancey, and Watauga
16 ...... Cleveland, Gaston, Lincoln, McDowell, and Rutherford
17 ...... Cherokee, Graham, Haywood, Henderson, Jackson-Swain, Macon-Clay, Polk, and Transylvania
18 ...... Buncombe and Madison
19 ...... Pitt



NORTH CAROLINA MEDICAL BOARD

(3-yr. term)

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BOARDS AND COMMISSIONS

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Paul Peterson	Field Coordinator
Daniel Mattingly, PA-C	Field Coordinator
Charlene Hockstra	Receptionist/Secretary

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VP-Membership	Susan Hammer (Douglas)
VP-Program Extension	Linda-Lee Hanrahan (L.Robert)
Executive Director	Sibyl Pedzwater

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EXECUTIVE DIRECTOR: William N. Hilliard, Jr., PO Box 6524, Raleigh, NC 27628 919-787-5859
OFFICERS TERM: 1 year; begins on January 1, 2000
MONTH ELECTED: September 1999
NUMBER OF MEMBERS: 550
ANNUAL MEETING: September 15-17, 2000 Kingston Plantation, Myrtle Beach, SC
NATIONAL HEADQUARTERS: American Society of Anesthesiologists, 520 N. Northwest Highway, Park Ridge, IL 60068-2573 847-825-5586

NORTH CAROLINA SOCIETY OF ASTHMA, ALLERGY AND CLINICAL IMMUNOLOGY

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SECRETARY-TREASURER: Craig LaForce, MD, 4301 Lake Boone Tr., Suite 309, Raleigh, NC 27607 919-787-5995
OFFICERS TERM: 4 years
MONTH ELECTED: October 1998
NUMBER OF MEMBERS: 43
ANNUAL MEETING: Duke University/Dee Symposium, every other year.
NATIONAL HEADQUARTERS: American College of Allergy, Asthma, & Immunology, 85 West Algonquin Road, Suite 550, Arlington Heights, IL 847-427-1200

NORTH CAROLINA CHAPTER, AMERICAN COLLEGE OF CARDIOLOGY

PRESIDENT: Robert Jones, MD, Duke University Medical Center, Durham, NC 27710
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SECRETARY-TREASURER: Joseph Babb, MD, Brody Sch. of Med., PCMH, Rm. 352, Greenville, NC 27858 252-816-5887
EXECUTIVE DIRECTOR: Holly Rice, 4101 Lake Boone Trail, Suite 201, Raleigh, NC 27607 919-787-5181
OFFICERS TERM: 3 years
MONTH ELECTED: October 1998
NUMBER OF MEMBERS: 375
ANNUAL MEETING DATE: October 6-8, 2000, Myrtle Beach, SC
NATIONAL HEADQUARTERS: American College of Cardiology, 9111 Old Georgetown Road, Bethesda, MD 20814 301-897-5400

NORTH CAROLINA COUNCIL OF CHILD & ADOLESCENT PSYCHIATRY

PRESIDENT: Fergus Pope, MD, 472 Grindstaff Road, Burnsville, NC 28714 828-675-9372
PRESIDENT-ELECT: Arthur Kelley, MD, Department of Psychiatry, WFU School of Medicine, Winston-Salem, NC 336-716-2240
SECRETARY-TREASURER: Ritz Ray, MD, 3024 Lyndhurst Avenue, Winston-Salem, NC 27103 336-768-3680
OFFICERS' TERM 2 years
MONTH/YEAR ELECTED: October 1997
NUMBER OF MEMBERS: 170
ANNUAL MEETING October 28-31, 1999 Asheville, NC (in conjunction with NC Psychiatric Association)
NATIONAL HEADQUARTERS: American Academy of Child & Adolescent Psychiatry, 3615 Wisconsin Ave. NW, Washington, DC 20016-3007 202-966-7300

AMERICAN ASSOCIATION OF CLINICAL ENDOCRINOLOGISTS, CAROLINAS CHAPTER

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EXECUTIVE DIRECTOR: W. Alan Skipper, PO Box 27167, Raleigh, NC 27611 919-833-3836
OFFICERS' TERM: 2 years
MONTH/YEAR ELECTED: September 1998
NUMBER OF MEMBERS: 84
ANNUAL MEETING: September 8-10, 2000, Kiawah Island Resort, Kiawah Island, SC
NATIONAL HEADQUARTERS: American Association of Clinical Endocrinologists, 1000 Riverside Ave., Ste. 205, Jacksonville, FL 32204 904-353-7878

NORTH CAROLINA SPECIALITY SOCIETIES

NORTH CAROLINA DERMATOLOGY ASSOCIATION

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EXECUTIVE DIRECTOR:	W. Alan Skipper, PO Box 27167, Raleigh, NC 27611 919-833-3836
OFFICERS TERM:	1 year
MONTH ELECTED:	11/99
NUMBER OF MEMBERS:	180
ANNUAL MEETING:	November 11, 2000, Grandover Resort, Greensboro, NC
WINTER PROGRAM	January 14-16, 2000, Holiday Inn Sunspree, Wrightsville Beach, NC
NATIONAL HEADQUARTERS:	American Academy of Dermatology, PO Box 4014, Schaumburg, IL 60168-4014 847-330-0230

NORTH CAROLINA COLLEGE OF EMERGENCY PHYSICIANS

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SECRETARY-TREASURER:	Charles Brown, MD, Brody Sch. of Med., 600 Moye Blvd., Greenville, NC 27858 252-816-4184
EXECUTIVE DIRECTOR:	Holly Rice, 4101 Lake Boone Trail, Suite 201, Raleigh, NC 27607 919-787-5181
OFFICERS TERM:	President 1 year; Secretary-Treasurer 2 years
MONTH ELECTED:	September 27, 1999
NUMBER OF MEMBERS:	535
ANNUAL MEETING:	June 2-4, 2000, Wrightsville Beach, NC
NATIONAL HEADQUARTERS:	American College of Emergency Physicians, PO Box 619911, Dallas, TX 75261-9911 214-550-0911

NORTH CAROLINA SOCIETY OF EYE PHYSICIANS & SURGEONS

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EXECUTIVE DIRECTOR:	W. Alan Skipper, PO Box 27167, Raleigh, NC 27611 919-833-3836
OFFICERS TERM:	1 year, take office in January
MONTH ELECTED:	September 1999
NUMBER OF MEMBERS:	300
ANNUAL MEETING:	June 22-25, 2000, Westin Resort, Hilton Head Island, SC
NATIONAL HEADQUARTERS:	American Academy of Ophthalmology, PO Box 7424, San Francisco, CA 94120-7424 415-561-8500 www.eyenet.org

NORTH CAROLINA ACADEMY OF FAMILY PHYSICIANS

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OFFICERS TERM:	1 year ; 3 years for Secretary-Treasurer
MONTH ELECTED:	December 1998
NUMBER OF MEMBERS:	2249
ANNUAL MEETING:	December 1-5, 1999, Grove Park Inn, Asheville, NC
NATIONAL HEADQUARTERS:	American Academy of Family Physicians, 8880 Ward Parkway, Kansas City, MO 64114-2797 800-274-2237

NORTH CAROLINA SPECIALITY SOCIETIES

NORTH CAROLINA INFECTIOUS DISEASE SOCIETY OF AMERICA
PRESIDENT: .... Harry A. Gallis, MD, PO Box 32861, Charlotte, NC 28232-2861 704-355-6650
PRESIDENT-ELECT: .... Christopher Ingram, MD, 2800 Blue Ridge Road #219, Raleigh, NC 27607 919-571-1567
SECRETARY-TREASURER: .... Dennis A. Clemets, MD, DUMC-Dept. of Pediatrics, PO Box 3675, Durham, NC 27710 919-477-4297
OFFICERS TERM: .... 2 years
MONTH ELECTED: .... October 1998
NUMBER OF MEMBERS: 117
ANNUAL MEETING: .... April, 2000
NATIONAL HEADQUARTERS: .. IDSA, 99 Canal Center Plaza, Ste. 210, Alexandria, VA Ph: 703-299-0200/Fax: 703-299-0204/Email: info@idsociety.org/ Home page: http://www.idsociety.org

NORTH CAROLINA COLLEGE OF INTERNAL MEDICINE
PRESIDENT: .... Lindsey E. deGuehery, MD, 1812 Glendale Drive, Wilson, NC 27893 252-291-5864
PRESIDENT-ELECT: .... Kevin P. High, MD, WFUSOM, Dept. of Medicine, Medical Center Blvd., Winston-Salem, NC 27157-1042 336-716-4584
GOVERNOR: .... James A. Bryan, II, MD, UNC, CB#7110-Dept. of Medicine, Chapel Hill, NC 27599-7110 919-966-2268
SECRETARY-TREASURER: .... Timothy S. Carey, MD, UNC School of Med., CB#7110-Dept. of Medicine, Chapel Hill, NC 27599-7110 919-966-2276
EXECUTIVE-DIRECTOR: .... William N. Hilliard, Jr., PO Box 6524, Raleigh, NC 27628 919-787-5859
OFFICERS TERM: .... 1I year
MONTH ELECTED: .... February 1999
NUMBER OF MEMBERS: 1700
ANNUAL MEETING: .... February 18-19, 1999, Washington Duke Inn, Durham, NC
NATIONAL HEADQUARTERS: .. ACP-ASIM, Independence Mall West, Sixth Street at Race, Philadelphia, PA 19106-1572

NORTH CAROLINA NEUROLOGICAL SOCIETY
PRESIDENT: .... Michael H. Bowman, MD, 4207 Lake Boone Tr., Ste. 200, Raleigh, NC 27607-6520 919-782-3456
PRESIDENT-ELECT: .... NONE
SECRETARY/TREASURER: .... William H. Hickling, MD, 1910 N. Church Street, Greensboro, NC 27405 336-273-2511
EXECUTIVE DIRECTOR: .... W. Alan Skipper, PO Box 27167, Raleigh, NC 27611 919-833-3836
OFFICERS TERM: .... 2 years
MONTH ELECTED: .... November 1998
NUMBER OF MEMBERS: 235
ANNUAL MEETING: .... November 4, 2000
NATIONAL HEADQUARTERS: .. American Academy of Neurology, 2221 University Avenue, SE, Suite 335, Minneapolis, MN 55414 612-695-1940

NORTH CAROLINA NEUROSURGICAL SOCIETY
PRESIDENT: .... C. Scott McLanahan, MD, Carolina Neurosurg & Spine Assocs., 1010 Edgehill Rd., North, Charlotte, NC 28207-1885 704-376-1605
SECRETARY-TREASURER: .... Bruce Kihlstrom, MD, Durham Clinic, PO Box 15149, Durham, NC 27704 919-479-4100
OFFICERS TERM: .... 2 years
MONTH ELECTED: .... November 1999
NUMBER OF MEMBERS: .... 80+
NATIONAL HEADQUARTERS: .. American Association of Neurological Surgeons, 22 South Washington Street, Park Ridge, IL 60068 708-692-9500

NORTH CAROLINA OBSTETRICAL AND GYNECOLOGICAL SOCIETY
PRESIDENT: .... Frank N.H. Harrison, MD, Carolinas Medical Center, Dept. of OB/GYN, Charlotte, NC 28232 704-355-3153
PRESIDENT-ELECT: .... H. Alexander Easley, III, JD., MD, Greenville OB/GYN, 101 Bethesda Drive, Greenville, NC 27834 252-758-4181
SECRETARY-TREASURER: .... Brenda S. Peacock, MD, Washington Women's Clinic, 614 East 12th St.., Washington, NC 27889 252-946-6544
EXECUTIVE DIRECTOR: .... W. Alan Skipper, PO Box 27167, Raleigh, NC 27611 919-833-3836
OFFICERS TERM: .... 1 year; 3 years for Secretary-Treasurer
MONTH ELECTED: .... May 1999
NUMBER OF MEMBERS: 490
ANNUAL MEETING: .... March 31-April 2, 2000, Kingston Plantation, Myrtle Beach, SC
NATIONAL HEADQUARTERS: .. American College of Obstetricians and Gynecologists, 409 12th St., SW, Washington, DC 20024 202-638-5577

CAROLINAS OCCUPATIONAL AND ENVIRONMENTAL MEDICAL ASSOCIATION
PRESIDENT: .... Michael Alday, MD, Regional Center for Occupational Medicine, 101 East Wood Street, Spartanburg, SC 29303
PRESIDENT-ELECT: ....
SECRETARY-TREASURER: .... Alex Sanchez, MD. 251 Duck Loop, Mooresville, NC 28117 704-342-8231
OFFICERS TERM: .... 1 year
MONTH ELECTED: .... September 1999
NUMBER OF MEMBERS: 200
ANNUAL MEETING: .... September
NATIONAL HEADQUARTERS: .. American College of Occupational & Environmental Medicine, 55 West Seegers Road, Arlington Heights, IL 60005 847-228-6851 www.acoem.org

NORTH CAROLINA SPECIALITY SOCIETIES

NORTH CAROLINA ONCOLOGY SOCIETY

PRESIDENT: Joseph R. Halperin, MD, Regional Cancer Center, 1200 North Elm Street, Greensboro, NC 27401 336-574-8276
PRESIDENT-ELECT: Eric J. Neijstrom, MD, 301 E. Wendover Avenue, Ste. 300, Greensboro, NC 27401 336-272-2141
SECRETARY-TREASURER: Keith A. Ayrons, MD, 2563 Pembroke Road, Gastonia, NC 28054 704-865-5210
EXECUTIVE DIRECTOR: Carol T. Russell, PO Box 33226, Raleigh, NC 27636-3226 919-467-3818
OFFICERS' TERM: 2 years
MONTH/YEAR ELECTED: October 1999
NUMBER OF MEMBERS: 125
NEXT ANNUAL MEETING: To be decided.
NATIONAL HEADQUARTERS: American Society of Clinical Oncology, 225 Reinekers Lane, Alexandria, VA 22314 703-299-1050

NORTH CAROLINA ORTHOPAEDIC ASSOCIATION

PRESIDENT: Donald K. Bynum, MD, UNC, Dept. of Orthopaedics, 250 Burnett-Womack, 229H, Chapel Hill, NC 27599 919-966-9079
PRESIDENT-ELECT: Stephen P. Montgomery, MD, PO Box 10707, Raleigh, NC 27605 919-781-5600
VICE-PRESIDENT: James F. Kellam, MD, CMC, Box 32861, Charlotte, NC 28232 704-355-6046
SECRETARY-TREASURER: Robert T. Wyker, MD, PO Box 10707, Raleigh, NC 27605 919-781-5600
RECORDING SECRETARY: Lowell H. Gill, MD, 1001 Blythe Blvd., Ste. 200, Charlotte, NC 28203 704-373-2023
EXECUTIVE DIRECTOR: Carol T. Russell, PO Box 33226, Raleigh, NC 27636-3226 919-467-3818
OFFICERS TERM: 1 year; secretary-treasurer 3 years
MONTH ELECTED: October 1999
NUMBER OF MEMBERS: 385
ANNUAL MEETING: October 5-8, 2000, Grove Park Inn, Asheville, NC
NATIONAL HEADQUARTERS: American Academy of Orthopaedic Surgeons, 6300 North River Road, Rosemont, IL 60018 847-384-4333

NORTH CAROLINA OSTEOPATHIC MEDICAL ASSOCIATION

PRESIDENT: Margaret Nusbaum, DO, MPH, 204 Parkside Cir., Chapel Hill, NC 27516 919-966-4612
PRESIDENT-ELECT: M. Jay Petruska, DO, 1264 Fenwick Hall Ct., Gastonia, NC 28056 704-825-4750
SECRETARY-TREASURER: Kevin Tebrugge, DO, 110 Jefferson, Ste. 102, N. Wilkesboro, NC 336-903-1445
EXECUTIVE DIRECTOR: Amy G. Williford, 152 Haywood Knolls Drive, Hendersonville, NC 28791 828-698-4348; fax 828-698-4348; bawilli@bellsouth.net
OFFICERS TERM: 9/99-9/2000
MONTH/YEAR ELECTED: September 1999
NUMBER OF MEMBERS: 70
ANNUAL MEETING: September 1, 2000 (Every labor Day weekend)
NATIONAL HEADQUARTERS: American Osteopathic Association, 142 E. Ontario St., Chicago, IL 60611 800-621-1773

NORTH CAROLINA SOCIETY OF OTOLARYNGOLOGY AND HEAD & NECK SURGERY

PRESIDENT: Peter G. Chikes, MD, 200 Medical Park Dr., Ste. 320, Concord, NC 28025 704-782-2166
PRESIDENT-ELECT: William W. Shockley, MD, UNC, CB# 7070, 610 Burnett-Womack Bldg., Chapel Hill, NC 27599-7070 919-966-3342
VICE-PRESIDENT: Marcus S. Albernaz, MD, #8 Doctors Park, PO Box 5007, Greenville, NC 27835-5007 252-752-5227
SECRETARY-TREASURER: Kim Jones, MD, 110 S. Estes Drive, Chapel Hill, NC 27514 919-942-7278
EXECUTIVE DIRECTOR: W. Alan Skipper, PO Box 27167, Raleigh, NC 27611 919-833-3836
OFFICERS TERM: 1 year
MONTH ELECTED: July 1999
NUMBER OF MEMBERS: 210
ANNUAL MEETING: July 27-30, 2000 Grove Park Inn, NC
NATIONAL HEADQUARTERS: American Academy of Otolaryngology - Head & Neck Surgery, One Prince Street, Alexandria, VA 22314 703-836-4444

NORTH CAROLINA SPECIALITY SOCIETIES

NORTH CAROLINA SOCIETY OF PATHOLOGISTS

PRESIDENT: Paula Szypko, MD, PO Box 5001, High Point, NC 27262 336-884-6064
PRESIDENT-ELECT: Edward H. Lipford, MD, Carolinas Medical Center, Dept. of Pathology, PO Box 32861, Charlotte, NC 28232 704-355-3467
VICE-PRESIDENT: Keith V. Nance, MD, Rex Hosp. Dept. of Pathology, 4420 Lake Boone Tr., Raleigh, NC 27607-7505 919-784-3286
SECRETARY-TREASURER: D. Emerson Scarborough, MD, PO Box 19864, Raleigh, NC 27619 919-250-8260
EXECUTIVE DIRECTOR: W. Alan Skipper, PO Box 27167, Raleigh, NC 27611 919-833-3836
OFFICERS TERM: 1 year
MONTH ELECTED: November, 1999
NUMBER OF MEMBERS: 217
ANNUAL MEETING: November 11, 2000, Grandover Resort, Greensboro, NC
NATIONAL HEADQUARTERS: College of American Pathologists, 325 Waukegan Road, Northfield, IL 60093-2750 847-832-7000

NORTH CAROLINA PEDIATRIC SOCIETY

PRESIDENT: Jane M. Foy, MD, Dept. of Pediatrics, WFUSM, Medical Center Blvd., Winston-Salem, NC 27157 336-727-8105
VICE-PRESIDENT: William C. Hubbard, MD, 4905 Professional Court, Raleigh, NC 27609-4968 919-872-0250
SECRETARY: Ave Maria Lachiewicz, MD, DUMC, Box 3364, Durham, NC 27710 919-684-5513
TREASURER: Henry C. Hawthorne, Jr., MD, 1920 South 16th Street, Wilmington, NC 28401 910-763-2072
EXECUTIVE DIRECTOR: Steven E. Shore, MSW 1303 Annapolis Drive, Raleigh, NC 919-852-1156
OFFICERS TERM: 2 years
MONTH ELECTED: September 1998
NUMBER OF MEMBERS: 1100
ANNUAL MEETING: September 20-24, 2000, Kingston Plantation, Myrtle Beach, SC
NATIONAL HEADQUARTERS: American Academy of Pediatrics, 141 Northwest Point Blvd., PO Box 927, Elk Grove Village, IL 60009 800-433-9016

NORTH CAROLINA SOCIETY OF PHYSICAL MEDICINE AND REHABILITATION

PRESIDENT: James T. McDeavitt, MD, Charlotte Institute of Rehab, 1100 Blythe Avenue, Charlotte, NC 28203 704-355-6100
VICE-PRESIDENT: &
PRESIDENT-ELECT:
SECRETARY-TREASURER: Dan Moore, MD, Regional Rehabilitation Center, 2100 Stantonsburg Rd., Greenville, NC 27858 252-816-4440
OFFICERS' TERM: 2 Years
MONTH/YEAR ELECTED: May 1997
NUMBER OF MEMBERS: 54
NEXT ANNUAL MEETING: Spring 1999
NATIONAL HEADQUARTERS: American Academy of Physical Medicine & Rehabilitation, 122 S. Michigan Ave., Ste. 1300, Chicago, IL 60603-6107 312-922-9366

NORTH CAROLINA SOCIETY OF PLASTIC AND RECONSTRUCTIVE SURGERY

PRESIDENT: L. Scott Levin, MD, DUMC, Box 3945, Durham, NC 27710 919-681-5079
PRESIDENT-ELECT: W. Byron Barber, MD, 300 W. Northwood Street, Greensboro, NC 27401 336-275-0910
SECRETARY: Kenneth S. White, MD, 2305 Canterwood Drive, Wilmington, NC 28401 910-343-0119
TREASURER: Damon P. Anagnos, MD, 184 Medical School Wing D, CB#7195, UNC, Chapel Hill, NC 27599-7195 919-966-4446
OFFICERS TERM: 1 year for President & President-Elect; 2 years for Secretary & Treasurer
MONTH ELECTED: November 1999
NUMBER OF MEMBERS: 75
ANNUAL MEETING: November 11, 2000
NATIONAL HEADQUARTERS: American Society of Plastic and Reconstructive Surgery, 444 East Algonquin Road, Arlington Heights, IL 60005 847-228-9900

NORTH CAROLINA ACADEMY OF PREVENTIVE MEDICINE

PRESIDENT: Desmond K. Runyan, MD, Department of Social Medicine, UNC-CH, CB#7240, Chapel Hill, NC 27599-7240 919-962-1136
NUMBER OF MEMBERS: 54

NORTH CAROLINA SPECIALITY SOCIETIES

NORTH CAROLINA PSYCHIATRIC ASSOCIATION

PRESIDENT: John G. Wagnitz, MD, PO Box 9, West End, NC 27376-9142 910-673-9111
PRESIDENT-ELECT: Ervin M. Thompson, MD, 501 Billingsley Road, Charlotte, NC 28211 704-358-2822
VICE-PRESIDENT: Kathleen Seibel, MD, 3010 Falstaff Road, Raleigh, NC 27610
SECRETARY: W. Randolph Grigg, MD, 859 Washington Street, Raleigh, NC 27608 919-828-9937
TREASURER: Michael N. Zarzar, MD, 5711 Six Forks Road, Raleigh, NC 27609 919-845-1555
EXECUTIVE DIRECTOR: Katherine P. Hux, 4917 Waters Edge Drive, Suite 250, Raleigh, NC 27606 919-859-3370 or 919-851-0067
OFFICERS TERM: president, president-elect & vice-president 1 year; secretary & treasurer 2 years - officers change in May each year.
MONTH OFFICERS ELECTED: May 2000
NUMBER OF MEMBERS: 850
ANNUAL MEETING DATE: September 14-17, 2000, Charleston, SC
NATIONAL HEADQUARTERS: American Psychiatric Association, 1400 K Street, NW, Washington, DC 20005 202-682-6000

OFFICERS AS OF MAY 1, 2000
PRESIDENT: Ervin M. Thompson, MD, 501 Billingsley Road, Charlotte, NC 28211 704-358-2822
PRESIDENT-ELECT: David Ames, MD, 203 Government Cr., Greenville, NC 27834 252-413-1811
VICE-PRESIDENT: L. Jarrett Barnhill, MD, Dept. of Psychiatry, CB# 7160, UNC School of Medicine, Chapel Hill, NC 27599-7160 919-966-4805
SECRETARY: Kathleen Seibel, MD, 3010 Falstaff Road, Raleigh, NC 27610 919-250-3105
TREASURER: Michael N. Zarzar, MD, 5711 Six Forks Road, Raleigh, NC 27609 919-845-1555
EXECUTIVE DIRECTOR: Katherine P. Hux, 4917 Waters Edge Drive, Suite 250, Raleigh, NC 27606 919-859-3370 or 919-851-0067

NORTH CAROLINA CHAPTER, AMERICAN COLLEGE OF RADIOLOGY

PRESIDENT: Christopher G. Ullrich, MD, Charlotte Radiology, PA, 3030 Latrobe Drive, Charlotte, NC 28211 704-362-1945
PRESIDENT-ELECT: Raul S. delaVega, MD, 2936 Grampion Way, Gastonia, NC 28054 704-864-4378
VICE-PRESIDENT: George A. Binder, MD, 401 Lakeshore Drive, Fayetteville, NC 28305 910-323-2012
SECRETARY-TREASURER: Dale R. Shaw, MD, Charlotte Radiology, PA, 3030 Latrobe Drive, Charlotte, NC 28211 704-362-1945
OFFICERS TERM: 1 year
MONTH ELECTED: April 1999
NUMBER OF MEMBERS: 640
ANNUAL MEETING DATE: May 5-7, 2000, Raleigh, NC
NATIONAL HEADQUARTERS: American College of Radiology, 1891 Preston White Drive, Reston, VA 22091 800-227-5463

NORTH CAROLINA SPINE SOCIETY

PRESIDENT: Bruce V. Darden, II, MD, Charlotte Spine Center, 2001 Randolph Road, Charlotte, NC 28207 704-339-1386
PRESIDENT-ELECT: Joe T. Minchew, MD, UNC Dept. of Orthopaedics, CB#7055, Burnett-Womack Bldg., Chapel Hill 27599-7055 919-966-5036
VICE-PRESIDENT: Stewart J. Harley, MD, 129 McDowell Street, Asheville, NC 28801 704-258-8800
SECRETARY-TREASURER: Timothy W. McGowen, MD, PO Box 25007, Winston-Salem, NC 27114 336-768-1270
EXECUTIVE DIRECTOR: Carol T. Russell, PO Box 33226, Raleigh, NC 27636 919-467-3818
OFFICERS TERM: 1 year
MONTH ELECTED: June 1999
NUMBER OF MEMBERS: 100
ANNUAL MEETING May 5-7, 2000, Grandover, Greensboro, NC

NORTH CAROLINA SPECIALTY SOCIETIES

NORTH CAROLINA CHAPTER, AMERICAN COLLEGE OF SURGEONS

PRESIDENT: Rollin S. Burhans, MD, PO Box 15698, Durham, NC 27704 919-479-4400
PRESIDENT-ELECT: A. Robert Cordell, MD, WFUSM, Dept. of Surgery, Medical Center Blvd., Winston-Salem 27157 336-716-4672
VICE-PRESIDENT: Matthew B. Martin, MD, 1002 N. Church St., Ste. 102, Greensboro, NC 27401 336-387-8121
SECRETARY-TREASURER: C. Stephen Powell, MD, Dept. of Surgery, Brody School of Medicine, RCMH Room 240, Greenville, NC 27858 252-846-8667
EXEC. SECETARY-TREASURER: Carol T. Russell, PO Box 33226, Raleigh, NC 27636-3226 919-467-3818
OFFICERS TERM: 1 year; 3 years for secretary-treasurer
MONTH ELECTED: July 1999
NUMBER OF MEMBERS: 650 active members
ANNUAL MEETING: July 6-9, 2000, Kingston Plantation, Myrtle Beach, SC
NATIONAL HEADQUARTERS: American College of Surgeons, 633 N. St. Clair St., Chicago, IL 60611 312-202-5000

NORTH CAROLINA SURGICAL ASSOCIATION

PRESIDENT: Gerry Hartzog, MD, 2800 Blue Ridge Rd., Ste. 50, PO Box 32090, Raleigh, NC 27607 919-781-0710
PRESIDENT-ELECT: Richard Larson, MD, 905 Johns Hopkins Drive, Greenville, NC 27834 252-758-1747
SECRETARY-TREASURER: Richard W. Zollinger, II, MD, 300 Billingsley Rd., Ste. 103, Charlotte, NC 28211 704-372-1306
OFFICERS TERM: 1 year (Secretary-Treasurer serves five years)
MONTH ELECTED: April 1999
NUMBER OF MEMBERS: 189
ANNUAL MEETING: April, 2000, Pine Needles Lodge & Golf Club, Southern Pines, NC

NORTH CAROLINA THORACIC SOCIETY

PRESIDENT: Peter S. Kussin, MD, DUMC, Box 31166, Durham, NC 27710 919-684-3202
PRESIDENT-ELECT: William Charles Sherrill, MD, Carolina Respiratory Specialists, 101 WT Harris Blvd., Charlotte, NC 28207 704-547-7466
SECRETARY-TREASURER: Ralph Whatley, MD, Brody School of Medicine, 3E-111 Brody, Greenville, NC 27858 252-816-4653
EXECUTIVE DIRECTOR: Stephen F. Willcox, ALA of NC, 1323A Capital Blvd., Ste. 102, Raleigh, NC 27603 919-832-8326
OFFICERS TERM: 1 year Officers change 11/99
MONTH ELECTED: April 1998
NUMBER OF MEMBERS: 224
ANNUAL MEETING: TBA
NATIONAL HEADQUARTERS: American Thoracic Society, c/o American Lung Association, 1740 Broadway, New York, NY 10019-4374

NORTH CAROLINA UROLOGICAL ASSOCIATION

PRESIDENT: Thomas C. Leitner, MD, 128 Ellen Street, Monroe, NC 28112 704-289-4361
PRESIDENT-ELECT: David M. Kraebber, MD, 512 6th Avenue, West, Hendersonville, NC 28739 828-692-6262
SECRETARY: Barry H. Bodie, MD, 512 6th Avenue, West, Hendersonville, NC 28739 828-592-6262
TREASURER: Timothy Gajewski, MD, 101 W.T. Harris Boulevard, Suite 5202, Charlotte, NC 28262 704-547-1495
EXECUTIVE DIRECTOR: W. Alan Skipper, PO Box 27167, Raleigh, NC 27611 919-833-3836
OFFICERS TERM: 2 years
MONTH ELECTED: January 2000
NUMBER OF MEMBERS: 270
ANNUAL MEETING: January 27, 2001 Triad Area
NATIONAL HEADQUARTERS: American Urological Association, Inc., 1120 North Charles Street, Baltimore, MD 21201 410-727-1100

NORTH CAROLINA AFFILLIATE ORGANIZATIONS

NORTH CAROLINA NURSES ASSOCIATION

PRESIDENT: Gwen Waddell-Schultz, MSN, RN, OCN, 117 Thetford Ct., Chapel Hill, NC 27516 919-286-0411, ext. 6141
PRESIDENT-ELECT: Martha Barham, MSN, RN, CAN, 707 Bridlewood Dr., Trinity, NC 27370 336-878-6000
VICE-PRESIDENT: Karen Willis, BSN, RN, 2151 Jefferson Avenue, Gastonia, NC 28056 704-834-2929
SECRETARY: Mary Holtschneider, MPA, BSN, RN, 7 Akal Court, Durham, NC 27713 919-684-3979
TREASURER: Bette Ferree, MSN, RN, 3708 Northshore Dr., High Point, NC 27265 336-869-6781
EXEC. DIRECTOR: Sindy Barker, PO Box 12025, Raleigh, NC 27605-2025 919-821-4250
OFFICERS TERM: 2 years
MONTH ELECTED: October 1999
NUMBER OF MEMBERS: 3413
ANNUAL MEETING: October 11-13, 2000,Adams Mark Hotel, Winston-Salem
NATIONAL HEADQUARTERS: American Nurses Assoc., 600 Maryland Ave., SW, Ste. 100W, Washington, DC 20024-2571 202-554-4444

OLD NORTH STATE MEDICAL SOCIETY

PRESIDENT: Arnett Coleman, MD, 407 Crutchfield Street, Durham, NC 27704 919-470-6570; fax 919-470-6574
PRESIDENT-ELECT:
TREASURER: Jesse F. Williams, MD, 2402 Rollinghill Road, Fayetteville, NC 28304
EXECUTIVE DIRECTOR: Lola P. George, 101 Robeson St., Ste. 200, Fayetteville, NC 28301 910-323-4081
OFFICERS' TERM: Two years (1997-1999)
MONTH/YEAR ELECTED: June 1997
NUMBER OF MEMBERS: 300
NEXT ANNUAL MEETING: July 1-4, Wyndam Myrtle Beach Resort, Myrtle Beach, SC
NATIONAL HEADQUARTERS: National Medical Association, 1012 Tenth Street, NW, Washington, DC 20001 202-347-1895

NORTH CAROLINA ACADEMY OF PHYSICIAN ASSISTANTS

PRESIDENT: Wilbert Dillard, PA-C, 3732 Crestbrook Lane, Pfafftown, NC 27040 336-725-0514
PRESIDENT-ELECT: Wade Marion, 853 Cross Creek Dr., Mt. Airy, NC 27030 336-719-6100
VICE PRESIDENT: W. Ashely Marion, 500 Chatham Medical Park, Elkin, NC 28621 336-835-2134
SECRETARY: Sue Reich-Atkins, PA-C, 4020 Ivy Bluff Trail, Winston-Salem, NC 336-716-9024
TREASURER: Paul Hendrix, MHS, PAC, 708 Duluth St., Durham, NC 27705 800-922-0312 (NC)
OFFICERS TERM: 1 year (January-December)
MONTH ELECTED: October 1999
NUMBER OF MEMBERS: 900+
ANNUAL MEETING: February 27-March 3, 2000
August. 2000
NATIONAL HEADQUARTERS: American Academy of Physician Assistants, 950 N. Washington Street, Alexandria, VA 22314-1534 703-836-2272

NORTH CAROLINA HEALTH CARE FACILITIES ASSOCIATION

CHAIRMAN: Gerald P. Cox, PO Box 7728, Rocky Mount, NC 27804 919-414-6265
VICE:CHAIR: Travis Tomlinson, 513 Whitaker Mill Road, Raleigh, NC 27608 919-828-2348
SECRETARY-TREASURER: Su Modlin, PO Box 763, Jamestown, NC 27282 252-523-9094
PRESIDENT: J. Craig Souza, 5109 Bur Oak Circle, Raleigh, NC 27612 919-782-3827
OFFICERS TERM: 2 years
MONTH ELECTED: March, 2000
NUMBER OF MEMBERS: 386
ANNUAL MEETING: February 6-9, 2000, Winston-Salem
NATIONAL HEADQUARTERS: American Health Care Association, 1201 L Street, NW, Washington, DC 20005 202-842-4444

NORTH CAROLINA AFFILLIATE ORGANIZATIONS

NORTH CAROLINA MEDICAL GROUP MANAGERS

PRESIDENT: Ruth A. Stewart, RN, CMPE, Durham Physicians, PA, PO Box 67, Semora, NC 27343 919-471-7655; fax 919-477-9005; fax 919-477-9005
PRESIDENT-ELECT: William D. Zalabak, Jr., FACMPE, Administrator, Mountain Medical Assocs., LLP, 600 Hospital Dr., Clyde, NC 28721 828-452-0331; fax 828-458-6100
SECRETARY: June L. Sides, CMPE, MSPH, Director of Operations, HealthServe Medical Center, 1002 S. Eugene Street, Greensboro, NC 27406-1241 336-271-5999x320; fax 336-271-5990
TREASURER: C. William McRae, CMPE, Administrator, Tri-County Orthopaedic & Sports Medicine, PA, 800 Chatham Medical Park, Elkin, NC 28621-2400 336-526-2324; fax 336-526-8626
EXECUTIVE SECRETARY: Theresa Salmen, CMP, NC Medical Group Managers, 4425 Randolph Rd., Ste. 304, Charlotte, NC 28211 704-365-0565; fax 704-365-3678
OFFICERS TERM: 1 year
MONTH ELECTED: November 1998
NUMBER OF MEMBERS: 400
ANNUAL MEETING: Spring: May 26-28, 1999, Atlantic Beach, NC
Fall: September 1999
NATIONAL HEADQUARTERS: MGMA, 104 Inverness Terrace East, Denver, CO 80112-5306 303-799-1111

NORTH CAROLINA HOSPITAL ASSOCIATION

PRESIDENT: William A. Pully NC Hospital Association, PO Box 4449, Cary, NC 27519-4449 919-677-2400
CHAIRMAN: J.L. Welsh, Jr., President, Southeastern Regional Medical Center, PO Box 1408, Lumberton, NC 910-671-5089
CHAIRMAN-ELECT: Michael C. Tarwater, Executive Vice President, Carolina HealthCare System, PO Box 32861, Charlotte, NC 28232 704-355-3216
SECRETARY: Dennis J. Phillips, President, Frye Regional Medical Center, 420 N. Center St., Hickory, NC 28601 828-324-3105
TREASURER: Barbara R. Cale, Administrator, Chowan Hospital, PO Box 629, Edenton, NC 27932 252-482-6268
OFFICERS TERM: 1year; take office in January
MONTH ELECTED: November 1999
NUMBER OF MEMBERS: 142
ANNUAL MEETING DATE: July 19-21, 2000
NATIONAL HEADQUARTERS: American Hospital Association, One North Franklin, Chicago, IL 60606 312-422-3000

NORTH CAROLINA SOCIETY OF MEDICAL ASSISTANTS

PRESIDENT: Rebecca Walker, CMA, PO Box34, Coinjock, NC 27923-0034 800-541-4270
PRESIDENT-ELECT: Marge Ottofy, CMA, 37 Brown Street, Weaverville, NC 28787 828-254-5934
1st VICE PRESIDENT: Ruth Durham, CMA, 200 Delray Avenue, High Point, NC 27265 336-841-6262
2nd VICE PRESIDENT: R. Glenn Grady, Med, BSMT, CMA, PO Box 1063, Louisburg, NC 28749 919-496-1567
SECRETARY: Elaine Norman, CMA, 2662 Roby Martin Rd., Lenoir, NC 28645 828-758-5501
TREASURER: Jennifer McLean, CMA, PO Box 1192, Candler, NC 28715 828-681-8206
OFFICERS' TERM: 1 year
MONTH/YEAR ELECTED: April 1999
NUMBER OF MEMBERS: 1,602
ANNUAL MEETING: April 22-25, 2000, Greenville, NC
NATIONAL HEADQUARTERS: American Association of Medical Assistants, 20 N. Wacker Drive, Suite 1575, Chicago, IL 60606 312-899-1500; 800-228-2262

NORTH CAROLINA COUNCIL OF PHYSICIAN EXECUTIVES

PRESIDENT: Greg Taylor, MD, Cape Fear Valley Medical Center, PO Box 2000, Fayetteville, NC 28302-2000 910-609-4000
VICE PRESIDENT:
SECRETARY-TREASURER:
MONTH ELECTED:
NUMBER OF MEMBERS: 65

ENDORSED PROGRAMS OF THE NORTH CAROLINA MEDICAL SOCIETY

Auto Leasing & Purchase Plan	PHYSICIANS LEASING COMPANY/800-888-8961
Auto Leasing & Rental	ALAMO RENT-A-CAR (code: B213-386)/800-327-9633 HERTZ RENT-A-CAR (code: CDP #006546)/800-654-2210
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Hotel/Dining Savings	QUEST (code 1931-43)/800-782-9450
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Magazine Discounts	NCMS MAGAZINE PROGRAM/800-289-6247 OUR STATE MAGAZINE/800-948-1409
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Revenue Enhancement Analysis	BROWN, McLEOD & JOHNSEN, CPAs, PA/919-782-1040
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Website Services	HEALTHDIRECTORY.COM/888-543-3424

To apply for membership in the North Carolina Medical Society (NCMS) or for more information on the products and services listed above, contact Shawn Scott, NCMS Director of Membership Services & Marketing, phone 919-833-3836, or visit NCMS Online at www.ncmedsoc.org.

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